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REPORT

OF THE

METEOROLOGICAL REPORTER

TO THE

GOVERNMENT OF BENGAL,

For the year 1868-69,

WITH A

METEOROLOGICAL ABSTRACT

For the year 1868.

CALCUTTA:
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REPORT OF THE METEOROLOGICAL REPORTER TO THE GOVERNMENT OF BENGAL, FOR THE YEAR 1868-69.

PART I.—ADMINISTRATION.

In the introduction of my Report for the year 1867-68, I defined the objects and duties of the department as mainly two fold, *viz.*, to carry out a system of storm warnings for the protection of the port, and to supervise the existing meteorological records and machinery of record, and render them useful for general information. Up to the date of that report these two divisions of the duties of the Department had, corresponding to them, distinct sets of collecting machinery, different systems of record, and different classes of stations, and they afforded, therefore, a convenient classification for the subject matter of the Report; but during the year now under review, many of these distinctions have been abolished, and the different classes of stations have been to a great extent assimilated in the kind of data registered and the mode of registration. A more convenient and natural classification of the work of the Department, therefore, will be one based on 1*st*, the *collection* of meteorological data; and 2*nd*, their *utilisation*. These two divisions of the subject matter will be treated of under the respective headings,

Meteorological Observation,
Central Office,

and their several sub-divisions.

METEOROLOGICAL OBSERVATION.

Up to the present time meteorological registration has been restricted to the land, and three classes of observing stations have been established in connection with this Department, distinguished respectively as 1st, 2nd, and 3rd class stations. Reports are also received from several stations in correspondence with the Department but not under its control.

1st Class Stations.—The stations of this class as enumerated in my report for 1867-68, are as follow:—

Saugor Island,	established	21st August, 1865.
False Point,	„	October, 1865.
Chittagong,	„	8th May, 1866.
Akyab,	„	7th May, 1866.
Cuttack,	„	21st March, 1867.
Dacca,	„	15th April, 1867.
Darjeeling,	„	1st July, 1867.

At all these stations, with the exception of False Point, the Electric Telegraph Assistant in charge of the local office is appointed meteorological observer on a salary of Rs. 50 per month. At False Point, the observations are recorded by the Light-house Superintendent as part of his general duties, with a stationary allowance of Rs. 10 per month. The full set of instruments supplied to these stations consists of—

- 2 Mercurial Barometers.
- 1 Dry bulb Thermometer.
- 1 Wet bulb Thermometer.
- 1 Maximum dry bulb Thermometer.
- 1 Minimum dry bulb Thermometer.
- 1 Minimum wet-bulb Thermometer.
- 1 Solar radiation Maximum Thermometer in vacuo.
- 1 Grass Minimum radiation Thermometer.
- 1 Robinson's Anemometer.
- 1 Wind-vane.
- 1 Rain Guage.

Sheds for the thermometers have been erected at four of the above stations, and will be erected at all, when suitable sites shall have been selected.

The observations are recorded five times daily: the barometer and wet and dry bulb thermometers at the four equi-distant periods, 4h., 10h., 16h., and 22h., and the rain-fall at 18h. The other instruments are recorded at one or more of these hours, according to requirement.

The observations made at 10h. and 16h. are telegraphed to Calcutta from four of the 1st class stations, *viz.*, Saugor Island, Chittagong, Akyab, and Cuttack. These telegrams show the reading of the barometer, the wet and dry bulb thermometers, the wind direction and force, the movement of the lower clouds and the general appearance of the weather. With a view to brevity and despatch, they are given in cipher, a specimen of which is appended. (Appendix A.)

2nd Class Stations.—This class includes ten stations, as sanctioned

Patna.
Gya.
Monghyr
Hazareebaugh.
Berhampore.
Jessore
Gowalparah.
Shillong.
Cachar.
Debrooghur.

In my report for 1867-68, I stated that certain recommendations for placing these stations on an improved footing had been submitted to Government by the Meteorological Committee, and were then under consideration. The scheme proposed by the Committee received the sanction of Government for one year as an experiment on the 16th July 1868, and steps were at once taken to carry it into execution.

According to this scheme, the 2nd class Observatories were placed under the superintendence of the Civil Surgeons of the respective stations, a Native Observer, instructed by the Meteorological Reporter, being appointed to perform the actual work of the Observatory. The Civil Surgeon receives a superintendence allowance of Rs. 30 per month; the Observer, (who has no other duties to perform) a monthly salary of Rs. 40.

The equipment of instruments is essentially the same for 2nd as for 1st class stations, and is as follows :—

1 Barometer.
1 Dry bulb Thermometer.
1 Wet bulb ditto.
1 Maximum dry bulb Thermometer.
1 Minimum ditto ditto.
1 Minimum wet bulb ditto
1 Solar radiation maximum ditto in vacuo.
1 Grass
1 Robinson's Anemometer.
1 Wind-vane.
1 Rain Guage
1 Reading Lens.
1 American Clock.
1 Bulls-eye Lantern.

The thermometers are placed under a shed, similar to that at 1st class stations, and in the hours of observation, forms of register, &c., there is also complete conformity. It has appeared advisable that, wherever practicable, a resident of the station should be appointed as the local observer, and as in some cases there has been some difficulty in finding a suitable person, four of the ten Observatories had not been completely established at the close of the year under report. One of these, however, *viz.*, Hazareebaugh, was virtually in full working order at an earlier period than any other station, the medical officer in charge, Dr. Coates, having preferred to make his own arrangements for carrying on the observations, and to draw merely the superintendence allowance for his station. It is due to Dr. Coates to observe, that for accuracy and completeness, his returns are unsurpassed by any received from other stations. To two other stations, *viz.*, Cachar and Gya, Observers had been appointed at the close of the year, but they had not assumed charge of their stations One alone, Shillong, is still unprovided. The Observers took charge of their respective Observatories at the remaining stations from the dates following :-

Berhampore	17th October, 1868.
Monghyr	13th Nobember, „
Patna	25th ditto., „
Jessore	10th December, „
Gowalparah	4th January, 1869.
Debrooghur	1st March,

Hazareebaugh (no paid Observer) transmitted full reports from 10th July, 1868.

3rd Class Stations.—From these stations, as a general rule, a return of rain-fall only is received. This is registered by the local subordinate Medical Officer as a part of his regular duties. According to the directions issued by this office, the reading of the rain guage should be recorded at 6 P. M. daily. From various causes, these rain-fall returns can be accepted only as a rough approximation to the truth ; but so regarded, they have considerable practical value. When these stations shall have been furnished with guages of uniform pattern, and shall have been subjected to efficient inspection, it may be possible to give a higher scientific value to their returns. The following 3rd class stations have reported during the year :—

Kishnagur.
Howrah.
Kooshteah.
Furreedpore.
Burdwan.
Sooree.
Bancoorah.
Balasore.
Chuprah.
Buxar.
Rampore Beauleah.
Rungpore.
Julpigoree.
Noakhally.
Tezpore.
Samoogoodting.
Tipperah.
Rangamatea Hill (Chittagong Hill Tracts)

Hooghly.
Serampore.
Pubna.
Alipore.
Raneegunge.
Midnapore.
Pooree.
Sumbulpore.
Arrah.

Maldah.
Bograh.
Dinagepore.
Mynagoree.
Gowhatty.
Nowgong.
Seebsaugor,
Burrisaul.
Sylhet.

In addition to the returns from the stations above classified, a few are communicated regularly from officers in other Presidencies, and from Observers in Bengal not officially connected with the department. The Government Astronomer in Madras forwards a daily telegram in the same form as those despatched from 1st class telegraphing stations, and the Meteorological Reporter for the North-Western Provinces at Roorkee, and the Principal of Benares College, send copies of their fortnightly and weekly registers. A daily report of the 10h. and 16h. observations, and a bi-monthly register of all instruments, as well as a copy of the barometric curve protracted from the hourly observations, and copies of the weekly and monthly abstracts published in the *Calcutta Gazette*, are received from the Calcutta Observatory. The following gentlemen have also furnished reports of the rain-fall and some other observations for their respective stations:

Captain H. H. Godwin Austin, Cherra Poonjee.
J. C. Vertannes, Esq., Contai.
Dr. Foster, Dholebagan.

And finally, Dr. Curran of Port Blair having, on my recommendation, been furnished with a set of instruments, forwards a register which the peculiar position of his station near the cradle of some of our most destructive cyclones renders one of very great value. Dr. Allen of Midnapore forwards a similar report for his station, and others less full and of various degrees of value are received from the Medical Officers of some other stations on the 3rd class list.

It would at present be premature to offer any decided opinion on the value of the meteorological observations recorded at the 1st and 2nd class stations above enumerated. During the last cold season, I visited one first class and two second class stations, and I have lately visited another of the former class. Neither of the second class stations had been organised on an improved footing, and they were among those least favourably placed for obtaining intelligent natives as Observers. While, therefore, they afforded instructive examples how untrustworthy a Meteorological Register is likely to be, if left to the unremunerated zeal of an untrained subordinate, they could in no way be admitted as representing average results even under the old system. At the two first class stations I have visited, Dacca and Chittagong, the work of observation was to all appearance carefully and conscientiously performed, and, as far as I can form an opinion from the registers forwarded to me, and from correspondence with the officers in charge or superintending, I believe that such is very generally the case at stations of both classes.

I trust during the present year as my other duties may permit, to visit the majority of the 1st and 2nd class stations not yet inspected.

For some months after the establishment of my office the principal difficulties in the way of obtaining trustworthy registers arose from the want of knowledge of instruments and their use on the part of the local observers, and it was but rarely that they could obtain information on such subjects from any local resident. The publication of a little book of Instructions and Rules for their special use has done much to remove these difficulties, and such training as the means at my command have enabled me to give to the native Observers appointed to 2nd class stations, has also helped to raise the character of the registers. But much still remains to be done in this direction, and until means are afforded in Calcutta to train and instruct, by practice in a working Observatory, as far as their opportunities allow, all who are appointed either as Observers or to the superintendence of Observatories, I do not look for that efficiency which I believe to be attainable under the system. Certain recommendations to this end have been submitted to Government, and are now under consideration.

Meteorological Registration at Sea.—An enquiry into the Meteorology of Indian Seas is an indispensible adjunct to any systematic investigation of that of the land, since all the principal Meteorological elements (barometric pressure, temperature, humidity, wind-direction, &c.,) are either determined or greatly modified by the difference in the relations of sea and land. The meteorological conditions of the Bay of Bengal more especially have an immediate bearing of the highest importance on that part of the work of the department which relates to storm warnings, and the information already available on this head has shown the urgent necessity for systematic observation at sea as well as on land. I have, therefore, made arrangements for establishing, on a small scale, and at first experimentally, a system of meteorological registration in Indian Seas, similar to that which has now been for some years in operation in connection with the Meteorological Department of the Board of Trade for all parts of the Ocean; and I have much pleasure in acknowledging the important assistance which has been readily afforded me in this undertaking by that department, under the directorship of Mr. R. H. Scott. At the close of the year under report, arrangements were almost completed for a first issue of instruments.

CENTRAL OFFICE.

The work of the Central Office may be classified, as in my report for the previous year, as—

A. Daily Reports to Newspapers.
B. Weekly Reports in the *Gazette.*
C. Monthly Abstracts.
D. Rainfall Reports.
E. Annual Report for all Stations
G. Special Reports.
F. Storm Warnings.

(A.) **Daily Reports.**—A Report is sent to the offices of the daily newspapers every afternoon about 5 P.M. It gives the Calcutta observations for 10hs. and 16h. of the day of issue, and all telegraphic reports received since the previous day's issue and up to 5 P. M. The following table, compiled for the

months of February and August (those in which the telegraph lines are subject to few and to a maximum of interruptions respectively), will fairly represent the average regularity of the telegraphic reports. Each station sends two reports daily, but from Madras the two are despatched in one telegram, and this never reaches Calcutta on the day of despatch.

STATIONS		Report issued for publication.									
		On day of observation.		One day after.		Two days after.		Three days after.		More than 3 days after	
		Feb	Aug	Feb.	Aug	Feb.	Aug	Feb.	Aug.	Feb	Aug
Sangor Island	...	57	59	..	3	...	..		...		
Cuttack	...	22	21	26	30	6	10	3	1	1	
Chittagong	...	17	8	39	26	4	11		8		6
Akyab	...	12	1	35	23	9	12	3	13		10
Madras	...	0	..	27	23	30	31	4	8	..	...

(*B.*) **Weekly Reports.**—Up to the close of the past calendar year, the reports published weekly in the *Gazette* comprised the full registers received from all stations, with the calculated daily means of the chief elements. But it was found that while the preparation and printing of these reports, occupying several closely printed pages of the *Gazette*, entailed much labor and a certain considerable expense, it was impracticable to issue them until several weeks after the period to which they referred. Thus their ephemeral interest was lost, while the form of publication in scattered supplements, was not adapted for permanent record. They were therefore discontinued in this form from December last, and the weekly publication in the *Gazette* has since been restricted to the telegraphic reports for the previous week and the rain-fall returns for all stations.

(*C.*) **Monthly Abstracts.**—An abstract of the mean Meteorological elements for all 1st and 2nd class stations, as well as of those stations external to Bengal which forward full registers, is prepared for each calendar month and published in the *Calcutta Gazette*. This report has been made more detailed than in the previous year. A specimen is given (*Appendix B*)

(*D.*) **Rain-fall Reports.**—These Reports are now prepared weekly for 58 stations, and sent to the Board of Revenue every Thursday. Special forms of return have been issued to the reporting stations. It is directed that these be dispatched by post every Monday, and, except from the more distant stations, they should thus reach the Meteorological Office in time for incorporation in the Thursday report. Those which arrive too late are incorporated in the report for the following week, and the report shows also the total rain-fall at each station from the 1st January up to the date of the return last received. (*See specimen, Appendix C*).

(*E.*) **Annual Reports.**—A summary of the Meteorological results of the past calendar year is published herewith. I do not propose at present to publish the detailed data, as, with perhaps some exceptions, I do not consider that they are of a character to justify the expense of such publication; and until all the stations have been inspected, and their defects ascertained and rectified, the detailed returns will be filed in the office, where they are open to the inspection of any who may wish to consult them. Copies of such as are considered fairly trustworthy are furnished also to applicants, on their paying the cost of copying.

(*G.*) **Special Reports.**—No Special Report has been published during the past year.

(*F.*) **Storm Warnings.**—Storm Signals have now been supplied to the Chamber of Commerce and the Trades Association, and, by the permission of the Asiatic Society, similar signals have been deposited at their building, and a mast and yard for hoisting them have been erected on the roof. The Government Dock-yard and the Sailors' Home have also been provided with sets of signals, so that, in the event of threatening weather, warnings will be communicated to the shipping and town from five conspicuous points, three of which are situated in the commercial part of the town. The signals consist of a *double cone* and a *drum*. The former is intended as a *caution* signal, and will be displayed whenever the appearance of the weather is such as usually precedes a cyclone; the latter will be hoisted when, from telegraphic reports and other sources of information, there is good reason to believe that such *a storm is actually approaching* the port. These signals are intended for conveying warnings during day-light only. Night signals are provided at the Dock-yard and Sailors' Home for warning the shipping. They consist of lamps arranged as a *lozenge* and *square* respectively, corresponding to the double cone and drum. Happily there has been no occasion during the past year to use any of these signals.

Library.—The Library has received presentations from the following Scientific Institutions and Societies and other donors, amounting to 201 works and parts of works.

1 Académie Royale, Amsterdam.
2. Académie Royale de Belgique
3 Chamber of Commerce, Calcutta.
4 Government of Bengal.
5 Home department of the Government of India.
6 K. K Geologische Reichsanstalt, Vienna
7 K. K Central Anstalt fur Meteorologie und Erd Magnetismus, Vienna.
8 Meteorological Department of the Board of Trade, London.
9 Meteorological Reporter, North-Western Provinces
10. Ditto, Punjab.
11. Royal Observatory, Greenwich.
12 Royal Society, London.
13 Royal Asiatic Society of London.
14 Smithsonian Institute, Washington.

15. Society of Arts, London,
16. Superintendent of Kew Observatory.
17. Superintendent of Bombay Observatory.
18. Washington Observatory.

The Cape of Good Hope Observatory, which should have appeared in the list given in my last year's report, was omitted by oversight.

Sixty-one works and pamphlets have also been purchased for the library.

FINANCE.

The total expenditure of the Department for the past year, exclusive of the cost of instruments, and a few other charges, which are not debited to the Budget of this Department, has amounted to Rs. 13,968-11-9, distributed as follows:—

	Rs.	As.	P.			
Salaries—						
Meteorological Reporter...	3,600	0	0			
Office Establishment ...	1,685	8	2			
Observers ...	4,454	11	6			
Superintendent's allowances ...	1,126	14	2			
				10,867	1	10
Central Office—						
Printing ...	1,031	0	0			
Contingent ...	419	5	8			
Purchase of Books ...	500	0	0			
				1,950	5	8
Observatories (land)—						
Building and repairs ...	150	0	4			
Furniture (including, clocks, &c.) ...	259	8	0			
Lighting, Stationery, &c. ...	168	6	8			
				577	15	0
Thermometer cages for ship ...	55	8	0			
				55	8	0
Travelling expenses—						
Meteorological Reporter ..	401	8	0			
Observers ...	116	5	3			
				517	13	3
Total ...				13,968	11	9

PART II.—METEOROLOGICAL ABSTRACT FOR 1868.

INTRODUCTORY REMARKS.

IN drawing up the following summary of Meteorological results for the year 1868, the data have been dealt with on the principles laid down in the introduction of my Report for the previous year. Every endeavour has been made to determine and eliminate the constant errors inherent to the instruments, and those due to their faulty position, and thus to render the registers of the several stations comparable the one with the other. Until, however, all the stations shall have been thoroughly inspected, it will not be possible to affirm that no constant error affects the register. These are such that, in some cases, personal inspection alone can detect them, and experience shows that however detailed and minute may be the instructions given, they alone are insufficient to ensure results thoroughly trustworthy. At the same time, by instruction, acquired in various ways, as well as by increased experience, the Observers at the different stations have, for the most part, so improved in the practice of their work that in point of accuracy the registers for the past year are superior to those summarised in my last Report. This remark must be understood to apply only to stations of the 1st and 2nd classes, those at which barometric and thermometric registers are kept. As has been observed in the administrative portion of the Report, the returns from stations reporting rain-fall only must be accepted in many cases as approximative rather than exact.

The number of stations at which a full register is kept, and for which barometric and thermometric data, &c., are here given, has been increased to twelve in Bengal, one in Arracan, and one in the Andaman Islands,—and I have added, for comparison, a summary of the returns for Roorkee, Benares, and Madras, for which I am indebted to Dr. Murray Thomson, the Meteorological Reporter for the N. W. Provinces, and Mr. Pogson, the Government Astronomer at Madras.

The Meteorological elements recorded are, or will be, when the stations shall be fully equipped,—

Barometric pressure,
Temperature (mean) of air.
Maximum temperature of air.
Minimum " "
Humidity.
Temperature of solar radiation.
Minimum temperature of grass nocturnal radiation.
Wind direction.
" force or velocity.
Rain-fall.
Cloud—forms, and quantity.
General atmospheric appearances.

But instruments are not yet available for obtaining a complete register from any station. There are, however, but few hiatus in the registers of the more important instruments.

HOURS OF OBSERVATION.

The hours of observation of the barometer, thermometer, and hygrometer, and in general of the wind direction and velocity, clouds and weather appearances, are 4h, 10h, 16h, and 22h, corresponding to the periods of average maximum and minimum barometric pressure. Local time has been observed at the majority of the stations, and should have been so at all, but it was lately found that, owing to misapprehension of the directions given, at Cuttack, Dacca, Chittagong and Akyab, telegraph or Madras time has been observed. This is 22 minutes later than Cuttack local time, 46 minutes later than Chittagong time, 41 minutes later than Dacca time, and 50 minutes later than Akyab time. The chief effect of this error of practice on the register, is to diminish the apparent range of the barometer, as deduced from the difference of the 10h and 16h observations, and the column for range is, therefore, left blank for these stations.

The minimum thermometers are recorded at 10h, and the maximum at 18h, up to which hour the rain-fall for the day is reckoned.

STATIONS.

The stations reporting have been classified in the first portion of this Report as 1st, 2nd, and 3rd class stations, but in discussing the registers it is needless to distinguish those of the first two classes.

The following table gives their respective geographical positions, and those of the stations external to Bengal, the registers of which are herein given; also the elevation of the barometer above sea level; or that of the general level of the station, where the exact elevation of the instrument has not been ascertained. I append, moreover, a brief description of the physical geography of each station, as far as I am able to do so from a personal knowledge of the place, or from trustworthy information.

STATION.	Lat. N.	Long. E.	Elevation in feet.	REMARKS.
Port Blair	11° 41′	92° 42′	218	Barometer cistern.
Madras	13° 5′	80° 17′	29	Barometer cistern approximately.
Akyab	20° 8′	92° 57′	25	Barometer cistern.
False Point	20° 20′	26° 47′	18·7	
Cuttack	20° 29′	85° 54′	80	
Saugor Island	21° 39′	88° 5′	4	
Chittagong	22° 21′	91° 50′	*108	Barometer cistern approximately.
Calcutta	22° 33′	88° 21′	18·11	Barometer cistern.
Jessore	23° 9′	89° 7′	15	Approximately.
Dacca	23° 43′	90° 27′	*35	Barometer cistern approximately.
Hazareebaugh	24°	85° 24′	2010	
Berhampore	24° 6′	88° 17′	*80	
Patna	25° 37′	85° 8′	171	
Monghyr	25° 22′	86° 30′	148·12	GTS Bench Mark.
Darjeeling	27° 3′	88° 18′	6780	
Benares	25° 20′	83° 2′	253·80	Cantonment B. M.
Roorkee	29° 52′	77° 56′	905	Roorkee College (L.M.)

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* These determinations, although not accurate, are within a few feet of the truth. The elevation of Chittagong was erroneously given as 166·47 ft in my Report for 1867; and that of Dacca as 22 ft.

Port Blair.—The penal settlement of the Andaman Islands is situated near the southern extremity of the eastern coast of the larger Island. A range of mountains runs through the island from north to south, protecting Port Blair in some measure from the south-west monsoon. The Observatory is situated on Viper Island, a small rocky islet some distance up the harbour.

Madras, situated on the flat alluvial formation of the Coromandel Coast, from beneath which the older crystalline rocks emerge at St. Thomas's, Mount, and Palaveram (7 and 10 miles from Fort St. George). The country rises gradually to the westward, forming the plains of the Carnatic or Payenghaut, and the nearest hills of considerable elevation are the Naggery Hills, fifty miles to the north-west. The Observatory is situated in the suburb of Nungambaucum, about three miles from the shore.

Akyab, on the coast of Arracan. The station is situated on flat and very low alluvial ground, the delta of the Koladyne river, much of which is flooded in the rainy season, The Arracan Hills, covered with an almost impenetrable jungle, are at a few miles distance to the north-east of the station.

False Point.—The light-house is a conspicuous land mark on the coast of Orissa, standing on a prominent point of the Mahanuddy delta. The country around is a dense swampy jungle, intersected with creeks. The nearest hills are those to the west of Cuttack, distant 50 miles. The coast line trends about north-east and south-west, so that winds from east and south are sea winds, those from west and north, land winds.

Cuttack is built on flat alluvial ground at the head of the Mahanuddy delta. The river, one of the largest in the peninsula of Hindostan, issues from a narrow hill gorge seven miles to the west of the station, and then divides into two main branches, the Kajouri and the Mahanuddy, in the fork of which Cuttack is situated. To the west and north the country is hilly, and much covered with jungle, while to east and south of the station stretches the delta of the Mahanuddy, the boundary of the hill country running parallel with the coast. The alluvial country is chiefly under rice cultivation, with the exception of a strip a few miles in width bordering the coast.

Saugor Island, the telegraph station at which is also the Meteorological Observatory, is situated close to the south-western extremity of Saugor Island, one of the low lying alluvial islands of the Soonderbuns, and at the point where the Hooghly enters the sea. To the south is the Bay of Bengal, to the west and north-west the estuary of the Hooghly, here about 20 miles broad, with the low marshes of Hidgellee beyond. To the east and north-east stretch the swampy jungles of the Soonderbuns, much of which are flooded at spring tides. Indeed, the station itself is below high water mark, and is protected by a strong dyke from inundation.

Chittagong, on the Arracan mainland, in the extreme north-east corner of the Bay of Bengal, and opposite to the embouchure of the Megna, the largest estuary of the Gangetic delta. A small river, the Kurnafoolee, from the Tipperah and Chittagong Hills, and forming the port of Chittagong, here enters the sea, from which the station of Chittagong is distant about 3 miles. The station is built on and around the little hills, 100 to 150 feet in height, which rise abruptly from the narrow alluvial belt, and form the broken edge of the more elevated plain, formed of highly inclined (tertiary ?) shales and other sedimentary rocks, which slopes up gradually to the foot of the hills, about 20 miles distant. Thus situated, the station is exposed to the brunt of the south-west monsoon, and the rain-fall, as along all the Arracan coast, is comparatively heavy.

Calcutta is situated 68 miles from the sea, and about the same distance from the western edge of the Gangetic delta alluvium, which formation stretches away northward to the Himalaya, 400 miles distant, and eastward for 200 miles nearly to the Tipperah Hills. About 3 miles to the east of Calcutta is the margin of the Salt Lake, a shallow brackish water lagoon in an unfilled depression of the delta. To the south of this much of the Soonderbun land is still unreclaimed from jungle, but elsewhere the greater part of the country is under rice cultivation. Undrained swamps (jhils) occur in many directions around Calcutta, and over all parts of the delta. The climate of Calcutta is, therefore, moist, and the herbage green throughout the year. The thermometer range, both annual and daily, is less than at stations higher up the country, and the latter in the driest month of the year (March) does not exceed 19° or 20°

Jessore, nearly in the middle of the delta of the Ganges, and about seventy miles north-east of Calcutta.

Dacca, between the former course of the Brahmaputra, (still in its lower part a broad channel, the Megna) and that which the river now follows to its confluence with the Pudda or Ganges, is a tract of rising ground elevated nearly 100 feet above the alluvia on either side. This tract is covered with marsh and jungle, growing on a red sandy soil, and is known as the Madhopore jungle. The station of Dacca is situated at the southern extremity of this tract, within a few miles of the Megna, on the bank of a small branch of the Brahmaputra. To the south is a network of broad rivers stretching to the sea, and in other directions (except the north) rice lands and grass jungle, which are flooded in the rains. At that time of year, with the exception of the Madhopore jungle, but little land is visible. Hence the high humidity of the station.

Hazareebaugh is situated in the elevated and hilly country of Chota Nagpore I am not acquainted with this station, and reserve any detailed description for a future report.

Berhampore, 170 miles from the sea, on the left bank of the Bhagirutee, 30 miles below where that river leaves the Ganges. It here flows nearly along the edge of the delta, since the ground begins to rise from a short distance to the west of the river, up to the foot of the Rajmehal hills, and the undulating country of Beerbhoom.

Patna, on the south bank of the Ganges, below the confluence of the Soane, and surrounded by the alluvial plains of these rivers.

Monghyr, situated on and around some low hills on the banks of the Ganges, which form the northern extremity of the Kurruckpoor range. Near Monghyr these hills are not more than a few hundred feet in height. They consist chiefly of quartzites, and presreving the same mineral characters, they stretch away in a broken chain to the south-west. To the north and west of Monghyr extends the great Gangetic plain; to the south and south-east, the rocky and elevated country of Hazareebaugh and the Damin-i-koh, chiefly covered with forest, and of which the Kurruckpore hills form the north-western corner.

Darjeeling, on a spur of the Singalelah range of the Sikkim Himalaya. The station is built partly on the crest of the ridge, partly on its western and south-western slope. The E. T. Office, at which the thermometers, barometer and rain-guage are kept, is in the latter position, a little below the summit. The wind vane, &c., are on the crest of the ridge.

Benares, on the north bank of the Ganges, 180 miles west of Patna. From the south bank of the river the alluvium extends to the foot of the Kymore plateau which intervenes between the valleys of the Ganges and the Soane. To the north is the flat alluvial expanse of Oude.

Roorkee, near the head of the Ganges canal, but a few miles distant from the foot of the Sewaliks, an outer range of the Himalaya.

BAROMETERS.

The instruments used at the majority of the stations, are mountain barometers, most ofthem on Fortin's principle, with a moveable plug for adjusting the mercury level in the cistern to the zero of the scale. At Akyab, a mountain barometer was used, which, owing to some unascertained defect, was so slow in action as to make the apparent range not more than $\frac{1}{3}$ or $\frac{1}{2}$ of that shown by other instruments of similar construction. The means of the readings of the several hours are therefore approximate only, but the daily means of the several months are apparently not much affected from this cause. The instruments have all been compared (before issue) with the Calcutta standard, and the corrections thus obtained have been applied to the registered readings. All the results have been reduced to the temperature of 0°C.

In the following Barometric Tables the monthly means of the several hours of observation* are given, for all the stations as far as they have been recorded, and the mean of each month deduced from the above. Also the range of the barometer between 10h. and 16h. which, in most months, are nearest the periods of highest maximum and lowest minimum, as may be seen from the table published by Colonel Walker in the Journal of the Asiatic Society, (Part II No. 2 of 1868.) The relation of this range to the actual range of the day at Calcutta may be gathered from the table below, which gives the mean difference of the 10h. and 16h. observations, and the actual mean range for each month of the past year as deduced from the hourly observations. For those stations and periods, for which two daily series of observations only are available, the mean of these is given, as approximately the mean of the month, and is distinguished by an (*). That there is but little difference between the daily means thus obtained, those deduced from four daily series and the means of hourly observations, will be seen from the following table which gives the monthly means thus variously deduced, for Calcutta, for the past year, and for comparison, the monthly means deduced by Colonel Walker from 10 years' observations.

MONTHS	MEAN RANGE 1868.		MEAN PRESSURES.			
	From 10h, to 16h.	Deduced from hourly obs.	Of 10h and 16h 1868.	Of 4 daily obs. 1868.	Of hourly obs. 1868.	Of hourly obs. for 10 years.
	inch.	inch.	ins	ins.	ins.	ins.
January ...	·134	·142	30·050	30·010	30·038	30·017
February ...	·133	·143	29·963	29·957	29·956	29·941
March ...	·132	·144	29·894	29·886	29·885	29·861
April ...	·130	·150	29·773	29·772	30·774	29·753
May ...	·120	·153	29·765	29·763	29·764	29·645
June ...	·085	·111	29·518	29·552	29·552	29·541
July ...	·085	·107	29·581	29·585	29·584	29·532
August ...	·091	·111	22·576	29·586	29·586	29·591
September ...	·110	·125	29·677	29·681	29·682	29·681
October ...	·112	·118	29·870	29·865	29·862	29·820
November ...	·124	·129	29·969	29·965	29·963	29·961
December ...	·129	·134	30·061	30·055	30·052	30·020

Hence it appears that in the cold weather months, the range of the barometer between 10h. and 16h. is approximately that of the day; in other words, these hours very nearly coincide with the periods of absolute maximum and minimum: whereas in June, the range between the same hours is little more than threefourths of that shown by the results of hourly observations. The differences of columns 1 and 2, and their ratios for each month are as follow.—

Months.		Differences.	Ratios.
January	...	·005 inch.	·964:1
February	...	·010 „	·930:1
March	...	·012 „	·916:1
April	...	·020 „	·861.1
May	...	·033 „	·791:1
June	...	·026 „	·765:1
July	...	·022 „	·791:1
August	...	·021 „	·819:1
September	...	·015 „	·880:1
October	...	006 „	·949:1
November	...	·005 „	·961:1
December	...	·005 „	·962:1

Probably for such stations as Berhampore, Jessore, and Dacca, the above ratios between the 10h. and 16h. mean range, and the actual barometric mean range would be found to hold good, but it is clear that while they vary with the length of the day in such a manner that the hours of 10 and 16 are most nearly those of barometric maximum and minimum when the days are shortest, and that, as is shewn by Colonel Walker's table,* the maximum occurs at an earlier and the minimum at a later hour when the days are longest, no formula will express the law of variation, that does not include as a second variable factor, the local humidity of the atmosphere for the different months; and it is far from probable that the same ratios would be found to apply to such places as Chittagong and Akyab on the one hand, or Patna and Benares on the other. It is, however, foreign to the object of the present report to enter on a discussion of the laws of the barometric tides, and it is not in this particular relation that the subject would be most advantageously treated.

The means of 10h. and 16h. approach much more nearly to the actual means as deduced from 24 hourly observations; and those of the four 6-hour periods deviate from the latter by an amount practically insignificant.

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* Journ. As. Soc. Bengal, 1869, Part. II., No.

Barometric Mean Monthly Pressures for 1868.

MADRAS.

	Mean.	4h.	10h.	16h.	22h.	Range.
January	29·985*		30·043	29·928		·115
February	29·962*		30·024	29·900		·124
March	29·911*		29·974	29·849		·125
April	29·812*		29·890	29·734		·156
May	29·771*		29·830	29·712		·118
June	29·683*		29·771	29·655		·116
July	29·727*		29·780	29·675		·105
August	29·743*		29·802	29·685		·117
September	29·764*		29·825	29·704		·121
October	29·863*		29·918	29·808		·110
November	29·934*		29·983	29·885		·098
December	30·007*		30·059	29·955		·104

PORT BLAIR.

	Mean.	4h.	10h.	16h.	22h.	Range.
January						
February						
March						
April						
May						
June	29·589*		29·625	29·553		·072
July	29·612*		29·639	29·585		·054
August	29·596*		29·629	29·563		·066
September	29·630*		29·671	29·589		·082
October	29·668*		29·717	29·620		·097
November	29·705*		29·757	29·653		·104
December	29·758*		29·810	29·706		·104

AKYAB.

	Mean.	4h.	10h.	16h.	22h.	Range.
January	29·966*		30·014	29·918		
February	29·930	29·911	29·982	29·883	29·944	
March	29·887	29·872	29·943	29·850	29·886	
April	29·851	29·851	29·892	29·819	29·844	
May	29·824	29·827	29·851	29·792	29·829	
June	29·727	29·725	29·738	29·715	29·732	
July	29·730	29·728	29·744	29·719	29·731	
August	29·691	29·692	29·707	29·679	29·701	
September	29·771	29·765	29·793	29·748	29·781	
October	29·848	29·841	29·877	29·814	29·860	
November	29·881	29·865	29·901	29·865	29·895	
December	29·997	29·988	30·022	29·966	30·011	

FALSE POINT.

	Mean.	4h.	10h.	16h.	22h.	Range
January	29·997	29·963	30·059	29·954	30·015	·105
February	29·927	29·915	29·977	29·872	29·947	·105
March	29·867	29·847	29·921	29·813	29·886	·108
April	29·745	29·730	29·807	29·691	29·754	·116
May	29·718	29·696	29·771	29·665	29·740	·106
June	29·549	29·522	29·581	29·513	29·582	·069
July	29·544	29·519	29·577	29·508	29·572	·069
August	29·557	29·530	29·593	29·517	29·588	·076
September	29·636	29·604	29·677	29·596	29·668	·081
October	29·825	29·797	29·879	29·782	29·843	·097
November	29·935	29·922	29·986	29·886	29·947	·100
December	30·028	30·011	30·081	29·979	30·042	·102

CUTTACK.

	Mean.	4h.	10h.	16h.	22h.	Range
January ...	29·954	29·935	30·017	29·891	29·974	·126
February	29·889	29·896	29·942	29·811	29·907	·131
March	29·813	29·800	29·873	29·748	29·832	·125
April	29·694	29·690	29·756	29·619	29·711	·137
May	29·672	29·670	29·731	29·611	29·676	·120
June	29·530	29·513	29·565	29·489	29·555	·076
July	29·533	29·520	29·563	29·488	29·562	·075
August	29·486	29·461	29·530	29·437	29·517	·093
September	29·652	29·630	29·701	29·599	29·678	·102
October	29·841	29·825	29·895	29·792	29·855	·103
November	29·936	29·919	29·991	29·880	29·955	·111
December	30·013	30·005	30·077	29·958	30·012	·119

SAUGOR ISLAND.

	Mean.	4h.	10h.	16h.	22h.	Range.
January	30·044*		30·097	29·992		·105
February	29·919*		29·975	29·864		·111
March	29·898*		29·946	29·851		·095
April	29·753*		29·801	29·706		·095
May	29·732	29·714	29·775	29·689	29·750	·086
June	29·518	29·500	29·544	29·487	29·543	·057
July	29·531	29·520	29·559	29·499	29·548	·060
August	29·471	29·460	29·502	29·436	29·487	·066
September	29·612	29·598	29·653	29·562	29·635	·091
October	29·803	29·784	29·852	29·759	29·816	·093
November	29·932	29·917	29·993	29·885	29935	·108
December	30·051	30·022	30·108	30·007	30·066	·101

CHITTAGONG.

	Mean.	4h.	10h.	16h	22h.	Range.
January	29·917*		29·965	29·870		·095
February	29·861*		29·905	29·817		·088
March	29·798*		29·849	29·748		·091
April	29·712	29·691	29·780	29·676	29·702	·104
May	29·692	29·690	29·738	29·636	29·706	·102
June	29·515	29·507	29·544	29·473	29·538	·071
July	29·546	29·540	29·574	29·503	29·567	·071
August	29·519	29·510	29·548	29·472	29·549	·077
September	29·638	29·610	29·669	29·584	29·660	·084
October	29·778	29·773	29·828	29·717	29·796	·111
November	29·852	29·833	29·899	29·805	29·873	·094
December	29·935	29·919	29·982	29·890	29·949	·092

CALCUTTA.

	Mean.	4h.	10h.	16h.	22h.	Range.
January	30·040	30·012	30·119	29·982	30·049	·137
February	29·957	29·929	30·030	29·897	29·973	·133
March	29·886	29·856	29·960	29·828	29·900	·132
April	29·772	29·753	29·838	29·708	29·789	·130
May	29·763	29·743	29·825	29·705	29·781	·120
June	29·552	29·529	29·591	29·506	29·582	·085
July	29·585	29·568	29·624	29·539	29·610	085
August	29·586	29·564	29·628	29·537	29·617	·091
September	29·681	29·661	29·732	29·622	29·708	·110
October	29·865	29·842	29·923	29·814	29·880	·112
November	29·965	29·939	30·031	29·907	29·982	·124
December	30·055	30·028	30·126	29·997	30·069	·129

JESSORE.

	Mean.	4h.	10h.	16h.	22h.	Range.
January	30·029*		30·096	29·963		·133
February	29·945*		30·011	29·880		·131
March	29·875*		29·935	29·816		·119
April	29·761*		29·825	29·697		·128
May	29·746*		29·806	29·686		·120
June	29·526*		29·575	29·478		·097
July	29·570*		29·611	29·529		·082
August	29·558*		29·602	29·514		·088
September	29·675*		29·723	29·628		·095
October	29·848*		29·897	29·800		·097
November	29·935*		29·992	29·878		·114
December	30·037*		30·097	29·977		·120

DACCA.

	Mean.	4h.	10h.	16h.	22h.	Range.
January						
February	29·970	29·966	30·022	29·917	29·977	
March	29·901	29·886	29·961	29·844	29·914	
April	29·803	29·797	29·867	29·747	29·801	
May	29·790	29·781	29·850	29·725	29·806	
June	29·573	29·551	20·632	29·514	29·593	
July	29·595	29·589	29·635	29·540	29·619	
August	26·565	29·551	29·606	29·511	29·594	
September	29·698	39·687	29·746	29·635	29·726	
October	25·855	29·887	29·897	29·818	29·869	
November	29·959	29·944	29·996	29·919	29·976	
December	30·046	30·028	30·097	29·998	30·061	

HAZAREEBAUGH.

	Mean.	4h.	10h.	16h.	22h.	Range.
January	27·987*		28·035	27·939		·096
February	27·911*		27·956	27·866		·090
March	27·878*		27·924	27·833		·091
April	27·780*		27·828	27·733		·095
May	27·759*		27·801	27·717		·084
June	27·578*		27·611	27·546		·065
July	27·567*		27·614	27·520		·094
August			Barometer			
September ...			broken.			
October	27·897	27·872	27·917	27·857	27·913	·090
November	27·968	27·941	28·017	27·927	27·986	·090
December	28·019	27·998	28·075	27·969	28·036	·106

BERHAMPORE.

	Mean.	4h.	10h.	16h.	22h.	Range.
January	29·964*		30·011	29·918		·093
February	29·897*		29·958	29·837		·121
March	29·822*		29·881	29·754		·137
April	29·700*		29·775	29·625		·150
May	29·700*		29·762	29·639		·123
June	29·471*		29·520	29·422		·098
July	29·514*		29·563	29·465		·098
August	29·514*		29·561	29·467		·094
September	29·621*		29·679	29·564		·115
October	28·816*		29·873	29·760		·11
November	29·923	29·912	29·980	29·861	29·939	·119
December	30·014	30·001	30·079	29·948	30·029	·131

PATNA.

	Mean.	4h.	10h.	16h.	22h.	Range
January						
February	29·805*		20·857	29·751		·103
March	29·703*		29·768	29·639		·129
April	29·590*		29·646	29·535		·111
May	29·569*		29·629	29·510		·119
June	29·357*		29·397	29·318		·079
July	29·370*		29·416	29·324		·092
August	29·402*		29·445	29·359		·086
September	29·495*		29·548	29·443		·105
October	29·699*		29·751	29·647		·104
November	29·813*		29·871	29·756		·115
December	29·892	29·865	29·960	29·850	29·892	·110

MONGHYR.

	Mean.	4h.	10h.	16h.	22h.	Range.
January						
February						
March						
April	29·591*		29·673	29·510		·163
May	29·550*		29·639	29·471		·158
June	29·364*		29·418	29·310		·108
July	29·391*		29·443	29·339		·104
August	29·412*		29·460	29·364		·096
September	29·528*		29·581	29·476		·105
October	29·734*		29·793	29·676		·117
November	29·840*		29·897	29·784		·113
December	29·921	29·906	29·971	29·887	29·921	·084

DARJEELING.

	Mean.	4hs.	10hs.	16hs.	22hs.	Range.
January	23·312	23·336	23·409	23·332	23·373	·077
February	23·297	23·266	23·328	23·266	23·311	·062
March	23·324	23·300	23·364	23·296	23·339	·068
April	23·301	23·293	23·344	23·269	23·311	·075
May	23·341	23·321	23·376	23·313	23·354	·063
June	23·214	23·207	23·236	23·186	23·228	·050
July	23·230	23·217	23·251	23·206	23·218	·015
August	23·235	23·218	23·258	23·210	23·255	·048
September	23·311	23·302	23·317	23·286	23·331	·061
October ...	23·391	23·371	23·428	23·367	23·399	·061
November	23·408	23·394	23·447	23·377	23·416	·070
December	23·388	23·374	23·427	23·362	23·389	·065

ROORKEE.

	Mean.	4h.	10h.	16h.	22h.	Range
January	29·143	29·129	29·190	29·110	29·116	·080
February	29·054	29·031	29·094	29·020	29·073	·074
March	29·001	28·974	29·050	28·971	29·012	·079
April	28·873	28·858	28·921	28·838	28·877	·083
May	28·821	28·806	28·874	28·791	28·815	·083
June	28·629	28·625	28·679	28·588	28·624	·091
July	28·648	28·637	28·694	28·613	28·651	·081
August	28·657	28·647	28·708	28·623	28·656	·089
September	28·783	28·782	28·838	28·744	28·771	·094
October	28·971	28·949	29·025	28·938	28·974	·087
November	29·072	29·061	29·135	29·047	29·048	·088
December	29·152	29·130	29·211	29·116	29·153	·095

BENARES.

	Mean.	4h.	10h.	16h.	22h.	Range.
January	29·838?	29·823	29·873	29·812?	29·845	·061?
February	29·747	29·730	29·806	29·702	29·750	·104
March	29·667	29·649	29·736	29·614	29·671	·122
April	29·522	29·518	29·584	29·475	29·514	·109
May	29·489	29·482	29·545	29·438	29·493	·107
June	29·310	29·307	29·360	29·259	29·317	·101
July	29·314	29·307	29·360	29·268	29·321	·092
August	29·361	29·344	29·403	29·327	29·370	·076
September	29.449	29·431	29·497	29·403	29·462	·094
October	29·641	29·629	29·698	29·577	29·661	·121
November	29·772	29·753	29·827	29·726	29·783	·101
December	29·854	29·831	29·914	29·814	29·861	·103

Calcutta is the only station of those here enumerated for which the mean barometric pressures of a long series of years are available for comparison with those of the year under review. The monthly means of 10 years, published by Colonel Walker, have already been given at page 14, side by side with those for the past year, and they exhibit the somewhat remarkable result that the mean barometric pressure for every month of last year, except one (August) was higher than the average of the ten years. This has induced me to calculate the means for a longer period, viz., for the sixteen years 1853-68, during which hourly observations have been recorded at the Surveyor-General's Office; and to compare the means of each month and year, with a view to ascertain if any secular change be apparent in the barometric pressure. The result is shown in the following table :—

Comparative Table of Mean monthly 3 1853-1868.

	January	February	March	April	May	Nov.	Dec.	Mean
Mean.	29 948.	30·025.	29 859.	29·757.	29·655.	29 966.	30·029.	29·781.
1853	+·014	—·038	—·013	—·012	+ 013	—·055	—·012	—·012
4	—·007	+·018	—·019	—·013	+·033	+·020	—·001	—·002
5	—·005	+ 057	+ 015	+ 003	— 010	+·020	—·013	+·007
6	+ 027	+·015	+·001	— 031	—·005	+·003	—·004	—·003
7	·000	—·061	—·024	+·003	—·058	—·003	+·012	—·008
8	—·028	+·030	—·010	+·015	—·072	+·051	+·006	+·002
9	— 024	+·032	+·019	+·052	+·041	·011	—·019	+ 013
1860	—·065	—·035	—·052	·000	—·042	—·036	—·017	—·018
1	—·046	—·034	— 006	—·046	—·045	—·045	—·021	—·022
2	—·013	— 023	—·041	+·035	+·029	— 041	—·065	—·012
3	+ 021	—·008	—·033	—·052	—·030	—·018	+·003	—·022
4	—·030	—·009	+·009	—·016	+·074	+·067	+·007	+·011
5	+·044	+ 024	+·063	+·038	—·004	—·016	+ ·005	+·019
6	+ 019	+·008	— 018	+·012	—·009	+·022	+·050	+·005
7	+·026	+ 018	+ 035	+·036	—·016	+·042	+·048	+·022
8	+ 016	+ 008	+ 026	+·017	+·109	—·003	+·023	+·023

ERRATUM, PAGE 25.

For { January 29·948 | February 30·025 } { January 30 025 | February 29·948

BENARES.

	Mean.	4h.	10h.	16h.	22h.	Range.
January	29·838?	29·823	29·873	29·812?	29·845	·061?
February	29·747	29·730	29·806	29·702	29·750	·104
March	29·667	29·649	29·736	29·611	29·671	·122
April	29·522	29·518	29·584	29·475	29·514	·109
May	29·489	29·482	29·545	29·438	29·493	·107
June	29·310	29·307	29·360	29·259	29·317	·101
July						

means for a longer period, viz., for the sixteen years 1853-68, during which hourly observations have been recorded at the Surveyor-General's Office; and to compare the means of each month and year, with a view to ascertain if any secular change be apparent in the barometric pressure. The result is shown in the following table :—

Comparative Table of Mean monthly Barometric pressures at Calcutta, for the years 1853-1868.

	January	February	March	April	May	June	July	August	Sept.	October	Nov.	Dec.	Mean
Mean.	29·948.	30·025.	29·859.	29·757.	29·655.	29·543.	29·536.	29·592.	29·634.	29·834.	29·966.	30·029.	29·781.
1853	+·014	—·038	—·013	—·012	+ 013	—·018	— 064	+·038	—·028	+ 033	—·055	—·012	—·012
4	—·007	+·018	—·019	—·018	+ 033	+ 001	+·016	—·011	— 034	+·017	+·020	—·001	—·002
5	—·005	+·057	+ 015	+·003	—·010	+·017	—·018	—·022	+ 007	+·019	+·020	—·013	+·007
6	+ 027	+·015	+·001	— 031	—·005	+ 002	— 044	+·050	—·011	—·041	+·003	—·004	—·003
7	·000	—·061	—·024	+·003	—·058	—·015	+·011	—·072	+·071	+·036	—·008	+·012	—·008
8	— 028	+·030	—·010	+·015	—·072	—·013	+·030	—·034	+·055	— 005	+·051	+·006	+·002
9	—·024	+·032	+·019	+ 052	+·041	+·011	— 006	+ 060	+·065	—·038	—·011	—·019	+ 013
1860	—·005	—·035	—·052	·000	—·042	+·001	—·004	+·013	— 017	—·024	—·036	—·017	—·018
1	—·046	—·034	— 006	—·046	—·045	+·029	—·002	+ 005	— 019	—·032	—·045	—·021	—·022
2	—·013	— 023	—·041	+·035	+·029	+·007	—·021	— 053	+·020	—·067	—·041	—·065	—·012
3	+·021	—·008	—·033	—·052	—·030	—·036	+·017	— 037	—·041	—·020	—·018	+·003	—·022
4	—·030	—·009	+·009	—·016	+·074	+·005	—·031	+ 029	·000	+·032	+·067	+·007	+ 011
5	+·044	+ 024	+·063	+·038	—·004	+·007	+ 029	+ 031	—·008	+·014	—·016	+·005	+·019
6	+ 019	+·008	— 048	+·012	—·009	—·025	+·051	—·008	—·018	+·004	+·022	+·050	+·005
7	+·026	+ 018	+·035	+·036	—·016	+·033	+·021	+ 015	—·039	+·046	+·042	+·048	+·022
8	+·016	+ 008	+ 026	+·017	+·109	+·009	+·048	— 006	—·002	+·028	—·003	+·023	+·023

Hence it would appear that the mean barometric pressure of the last two years has been sensibly higher than the mean of the 16 years, and, indeed, if the figures were thoroughly trustworthy, higher than that of any single year in that period; but nothing like any definite cycle of variation can be detected in the table. But there is one fact for which I am indebted to Colonel Gastrell, which forbids any such hasty conclusion. The observations above summarised have been made on the same barometer throughout, and in the same position; but in August, 1866, a film or crust of mercurous oxide was removed from the surface of the cistern; and inasmuch as this oxide is less dense than mercury, if the crust were tolerably thick and had been long in accumulating, it is clear that a sensible error would affect all readings made from its surface; and thus a portion of the apparent deficit in the means of previous years, (or of apparent excess in those of the last two years,) would be accounted for.

To facilitate comparison, *inter se*, the monthly means of the several stations have been reduced to sea level from the elevations given at page 10, and for the temperatures given in the following pages. Darjeeling has not been included in this reduction.

Barometric Monthly Means reduced to Sea level, 1868.

STATIONS.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	Dec.
Port Blair ...	......	......	......	......	......	29·810*	29·835*	29 819*	29·853*	29·891*	29·928*	29·982*
Madras ...	30·015*	29·992*	29·941*	29·841*	29·800*	29·742*	29·756*	29·772*	29·792*	29·892*	29·955*	30·037*
Akyab ...	29·993*	29·956	29 913	29·877	29·850	29 753	29·756	29·720	29·797	29·874	29 907	30·023
False Point ...	30 017	29·946	29 884	29·763	29 736	29·567	29·562	29·575	29·654	29·843	29·953	30·048
Cuttack ...	30·038	29 973	29·896	29·776	29·754	29·613	29·615	29 568	29·735	29·924	30·020	30·097
Chittagong ...	30·021*	29·974*	29·909*	29·823	29·802	29·626	29·657	29·630	29·749	29·922	29·964	30·048
Saugor Island.	30 048*	29 919*	29·902*	29·757*	29·736	29 522	29·535	29·475	29 516	29·807	29·936	30 055
Calcutta ...	30·059	29·976	29·904	29·790	29·781	29·570	29 603	29·601	29·699	29·868	29·983	30·074
Hazareebargh.	30·063*	29·948*	29 890*	29·789*	29·720*	29·546*	29·509*	?	?	29·953	30·010	30·093
Jessore ...	30·045*	29·961*	29·885*	29·776*	29·761*	29·541*	29·584*	?	29·695*	29·863*	29·950*	30·053*
Berhampore ...	30·053*	29·976*	29·894*	29 777*	29 777*	29·547*	29·590*	29·590*	29·715*	29·882*	30·002	30·093
Dacca ...	......	30 013	29·942	29·844	29·831	29·614	29 636	29 605	29·739	29·896	29·999	30·088
Monghyr ...	......	......	......	29·742*	29·701*	29 515*	29·542*	29·564*	29·679*	29·878*	29 996*	30 078
Patna ...	......	29 984*	29·878*	29·762*	29·740*	29 549*	29 542*	29 574*	29·684*	29·872*	29 989*	30·074
Benares ...	30 214	30·020	29 928	29 883	29 747	29 570	29·573	29 621	29·710	29 902	30 038	30·125
Roorkee ..	30 085	30·004	29 914	29 763	29 694	29·491	29·517	29 523	29 658	29 861	30·000	30 091

TEMPERATURE OF AIR.

The instruments used for recording the temperature are for the most part of Messrs. Negretti's and Zambra's manufacture and of recent construction. Many of them have passed through my hands before they were issued, and as far as could be judged from a cursory comparison appeared to be fairly accurate. Some minimum thermometers supplied to 1st Class Stations, which had been for some time in the country, were compared with a Kew standard thermometer through a range of temperature, greater than that to which they are exposed in use, and a table of corrections constructed for such instrument.

It has been mentioned in the first part of this Report, that at most stations the thermometers for recording the temperature of the air are placed in a cage with open wire-netting in back and front, under a thatched shed, open all round. The exceptions are Akyab, Chittagong, Dacca, Darjeeling, and Cuttack. At the second of these Stations they are placed in a very airy room with doors on three sides opening into verandahs; and although the brickwork of the building inevitably diminishes the range of temperature, the exposure may be considered equal to that afforded in a verandah. A similar remark will apply to Dacca, where the thermometers were placed against a masonry column in the middle of a large upper room facing to the North, and with windows (which were generally open), on three sides. At Cuttack the thermometers were in a verandah facing to North.

The range of temperature at several Stations is given by the self-registering maximum and minimum thermometers directly, and is affected only by instrumental errors, which, I believe to be in every case trivial. The mean temperatures are calculated from the four daily observations whenever these are available. At some Stations at which this is not the case, but at which the minimum temperature is recorded, I have given the mean as calculated from this latter and the 16h observation—a method proposed, I believe, originally by Messrs. Schlagintweit. By either of these methods an approximation to the actual mean temperature is obtained. But even the former is less accurate than when applied to barometric readings, since the curve of daily temperature is less regular in form than the ordinary barometric wave. A comparison of the results of these methods for Calcutta, and the means of the maximum and minimum temperatures, with the means deduced from hourly observations, is given in the following table. I give also, for comparison, the corresponding means of the hourly observations of 15 years :—

	Means for 1868 of				Mean for 16 years
	4h. 10h. 16h. & 22h.	Min. & Max.	Min & 16h.	Hourly obs.	Of hourly obs.
January ...	68·6	68.8	68·3	68·3	67·6
February ...	72·6	72·8	72·5	72·1	72·8
March ...	80·0	80·5	80·2	79·5	80·5
April ...	83·5	84·	83·1	83·1	84·5
May ...	84·6	85·2	84·2	84·3	86·
June ...	83·8	83·8	83·1	83·6	84·9
July ...	84·4	84·8	84·1	84·2	83·5
August ...	83·5	83·7	83·1	83·3	83·
September ...	83·2	83·8	82·8	83·1	83·2
October ...	82·4	82·7	82·1	82·2	81·4
November ...	75·2	75·6	74·9	75·	74·7
December ...	69·0	69·3	68·6	68·7	67·8

From the above it appears that either the mean of four equiperiodic observations daily, or that of the minimum and 16h. observations gives a result very close to the real mean temperature. At some stations, indeed, the difference of the results yielded by the two former methods is somewhat greater than at Calcutta. Thus, at Hazareebaugh, the $\frac{\text{min}+16\text{h.}}{2}$ mean is about 1° lower than that obtained by the other method, but neither can be considered as exact. In the following tables the means deduced by Messrs. Schlagintweit's method are distinguished by an (*) :—

Maximum, Minimum, and Mean Monthly Temperatures for 1868.

PORT BLAIR.

	Mean.	4h.	10h.	16h.	22h.	Mean of Max.	Mean daily range.	Mean of Min.	HIGHEST MAX.		Monthly range	LOWEST MIN.	
									Day.	°		Day.	°
January ...	76·4*		78·8	80·4		81·1	8·6	72·5	28th	84·0	17·0	11th	67·0
February ...	76.8*		80·9	8.16		821	10·1	72·0	28-29	84·0	14·0	29th	70·0
March ...	78·8*		82·7	83·4		84·6	10·4	74·2	24th	89·0	18·0	6th	71·3
April ...	82·3*		85·8	86·8		87 8	10·0	77·8	30th	92·0	17-0	27th	75·0
May ...	80 1*		84.7	83 4		86·4	9·6	76·8	1st	93·0	19·0	9th	74·0
June ...	82·2*		84 2	84·6		86·2	6·4	79·8	14th	89·0	14·0	20th	75·0
July ...	79·6*		82·6	82·9		84·3	8·0	76·3	2nd	89·0	16·0	14th	73·0
August ...	80·1*		82·9	82·8		85·1	7·6	77·5	24th	89·0	15·0	28—29	74·0
September...	79·2*		82·6	81·6		84·6	7·8	76·8	26th	87·0	13·0	29th	74·0
October ...	79·8*		83·5	83·6		85·6	9·5	76·1	28th	88·0	16·0	6th	72·0
November...	78·8*		82·6	82·2		85·4	9·9	75·5	19—20	88·0	15·0	16th	73·0
December ...	77·7*		31·0	81·4		82·0	8·0	74·0	2—3	84·0	15·0	27th	69·0

	MADRAS.					AKYAB.				
	Mean.	4h.	10h.	16h.	22h.	Mean.	4h.	10h.	16h.	22h.
January ...			77.6	77·6		......	......	69·8	77·1	......
February ...			82·2	82·4		73·9	70·4	72·3	78·9	74·1
March ...			84·9	84·8		77·4	74·4	77·8	82·9	74·5
April ...			91·3	87·8		82·7	79·9	83·5	85·6	82·1
May ...			92·9	89 3		84·4	80·8	85·5	87·6	84·0
June ...			89·5	88·9		82·9	81·6	83·7	84·0	82·3
July ...			86·8	88·2		81·6	79·9	82·6	82·9	81·0
August ...			87·6	89·5		82·3	80·2	83·7	83·9	81.7
September ...			87·8	87·9		82·8	80·2	84·9	84·2	81·9
October ...			86·4	84·7		81·3	77·7	84·1	83·9	79·8
November ...			82·0	81·5		78·6	76·1	80·6	81·0	76·8
December ...			81·0	80·0		71·3	67·8	74·0	74·9	68·6

	FALSE POINT.					CUTTACK.				
	Mean.	4h.	10h.	16h.	22h.	Mean.	4h.	10h.	16h.	22h.
January ...	69·5	63·8	71·5	72·8	70·0	69·3	63·1	70·3	76·2	67·6
February ...	74·3	69·5	76·4	77·5	73·9	74·0	68·0	75·3	80·9	71·9
March ...	78·9	75·4	80·5	81·7	78·3	79 0	71·8	81·2	86·3	76·9
April ...	83·5	81·3	84·5	85·6	82·8	86·0	80·5	87·7	91·1	84·8
May ...	86·2	84·9	86·6	87·3	86·1	87 5	82·3	89·6	91·3	87·0
June ...	85·4	84 3	86·0	86·2	85·3	83·4	80·8	85·9	85·6	82·2
July ...	85·9	84·8	85·8	86·7	86·4	84·6	81·5	86·8	87·0	83·2
August ...	85·1	84·0	85·4	86·2	85·0	84·2	80·7	86·3	86 5	83·5
September ...	84·7	84·0	84·8	85·7	84·4	83·1	80·5	85 2	84·9 ?	82·1
October ...	84·1	82·4	84·4	85·3	84·2	81·2	76·2	83·7	86·2	78 7
November ...	76·9	72·9	77·2	79·7	77·8	73·2	65·4	78·7	79·6	69·2
December ...	70·8	64·5	71·9	75·4	71·5	68·7	61·3	71·8	75·9	65·9

	SAUGOR ISLAND.					CHITTAGONG.				
	Mean.	4h.	10h.	16h.	22h.	Mean.	4h.	10h.	16h.	22h.
January ...			63·4	67·6				66·9	70·8	
February ...			73·6	78·6				70·0	73·8	
March ...			81·1	83·9				76·8	80·5	
April ...			85·0	89·7		80·1	77·8	80·1	82·3	80·2
May ...	86·1	83·4	86·9	88·0	86·8	82·6	80 6	83 0	84·9	82·2
June ...	84·3	82·9	84·7	85·8	84·0	81·4	80·4	81·8	82·3	81·2
July ...	85·0	83·5	85·0	87·0	84·6	81·0	79·7	81·8	82·0	80·5
August ...	84·5	83·1	84·5	86·1	84·4	81·7	80·0	82·4	83·3	81·2
September ...	83·8	82·1	84·2	85·9	83·1	81·5	79·6	82·2	83·4	81·1
October ...	82·4	78·1	83·4	87 3	80·8	80·3	77·4	81·4	82·9	79·6
November ...	75·8	70·8	76·8	82·2	73·7	75·3	72·0	76·5	78·3	74·4
December ...	69·3	64·7	70·9	74·5	67·3	69·2	63·9	71·5	73·7	67·9

CALCUTTA.

	Mean.	4h.	10h.	16h.	22h.	Mean of Max.	Mean daily range.	Mean of Min.	Highest Max.		Monthly range.	Lowest Min.	
									Day.	°		Day.	°
January ...	68·6	62·4	69·6	75·6	66·9	76·6	15·6	61·0	28—30	80·0	24·6	3rd	55·4
February...	72·6	66·8	73·7	79·8	70·2	80·4	15·2	65·2	21st	88·5	31·1	2nd	57·4
March ...	80·0	72·3	81·8	89·4	76·[illegible]	90·0	18·9	71·1	29th	96·7	34·0	8th	62·7
April ...	83·5	77·4	86·5	90·5	79·7	92·2	16·4	75·8	30th	98·5	31·0	5th 6th	67·5
May ...	84·6	78·9	87·5	91·0	81·3	93·0	15·5	77·5	6th	98·0	26·6	11th	71·4
June ..	83·8	81·4	84·8	86·5	82·6	87·9	8·1	79·8	4th	96·2	19·2	13th	77·0
July ...	84·4	81·3	85·5	87·4	83·5	88·7	7·8	80·9	3rd	93·4	17·4	10th	76·0
August ...	83·5	80·8	84·2	86·4	82·8	87·6	7·7	79·9	5th	92·4	16·9	11th	75·5
September	83·2	80·5	84·8	86·1	81·7	88·0	8·4	79·6	3rd	91·8	14·4	29th	77·4
October ...	82·4	77·8	84·7	87·0	80·3	88·1	10·8	77·3	14th	92·1	21·3	29th	70·8
November	75·2	69·5	77·0	81·4	73·2	82·8	14·3	68·5	11th	87·1	23·1	23rd	64·0
December...	69·0	62·9	70·8	75·7	66·6	77·1	15·5	61·6	13th	81·0	25·0	24th	56·0

JESSORE.

	Mean.	4h.	10h.	16h.	22h.	Mean of Max.	Mean daily range.	Mean of Min.	Highest Max.		Monthly range.	Lowest Min.	
									Day.	°		Day.	°
January ...	64·4*		67·5	76·5		...	...	52·4	...	...	...	10th	46·5
February...	67·9*		72·3	79·8		80·7	24·6	56·1	22nd	87·0	38·1	6th	48·0
March ...	77· *		82·1	89·0		89·9	24·9	65·0	29th	99·0	44·1	12th	54·9
April ...	76·6*		81·3	85·1		89·3	21·1	68·2	30th	100·0	48·8	6th	51·2
May ...	80·3*		87·6	86·8		92·9	19·1	73·8	6th	100·5	33·1	9th	67·4
June ...	81·7*		85·3	85·9		88·3	10·7	77·6	25th	96·8	25·3	13th	71·5
July ...	82·5*		87·0	86·7		89·4	11·0	78·4	4th	94·8	19·9	9th	74·9
August ...	82·1*		86·3	86·3		89·1	11·1	78·0	23rd	93·5	19·6	24th	73·9
September	81·1*		86·4	84·9		89·3	11·4	77·9	10th	93·9	18·4	26th	75·5
October ...	78·2*		86·8	86·0		89·2	18·8	70·4	6th	93·0	31·0	30th	62·0
November	72· *		79·9	83·4		84·9	24·3	60·6	3rd	88·8	35·9	30th	52·9
December...	63·8*		74·0	77·7		79·4	29·5	49·9	17th	81·0	39·0	31st	42·0

	DACCA.					DARJEELING.				
	Mean.	4h.	10h.	16h.	22h.	Mean.	4h.	10h.	16h.	22h.
January ...	......	......	......	......	......	42·1	38·1	42 8	47·2	40·3
February ...	71·1	70·0	71·1	72 6	71·0	41·6	37·9	42·1	45·8	40·8
March ...	78·4	76·0	78·4	81·2	78 0	50·4	45·2	51 7	56·2	48·8
April ...	80·6	78 7	81·0	82 9	80·0	55 0	51·0	57·1	57·6	54 5
May ...	82·4	80·2	83·1	84·9	81·7	58·9	53·9	61·5	63·5	56 8
June ..	82·8	81·6	83·3	83 9	82 5	64·1	60·5	65 9	67·6	62·5
July ...	83 0	82·0	82·9	84·2	83·0	63·9	61·0	64·5	67·1	63·0
August ...	83·8	82·7	84·0	85·0	83·7	65·1	61.0	66·2	68·6	64·0
September ...	83·2	81·9	84 0	84·3	82·7	62·8	59 1	64·6	66·6	61·2
October ...	81·4	79·4	82·2	82 7	80·5	58·0	53·5	60·2	63·2	55·4
November ...	76·3	74·3	77·2	78·0	75·9	51·2	46·1	54·7	55·3	48·7
December ...	69·8	68·5	70 0	71·3	69·4	43 7	39 8	44·8	48·3	42 1

HAZAREEBAUGH.

	Mean.	4h.	10h.	16h.	22h	Mean of Max.	Mean daily range.	Mean of Min.	Highest Max		Monthly range	Lowest Min.	
									Day.	°		Day.	°
January ...	60· *		62 1	70·0		72·1	22·1	50 0	27th	76 0	33·0	2nd	43·0
February...	60·6*		65·3	68·1		71·4	18·3	53·1	23rd	84·0	40 0	1st	44·0
March ...	72 3*		76·1	82·7		86·2	24·3	61·9	30th	91 0	39 0	1st	55 0
April ...	81·2*		83·5	92 0		94·9	24·4	70·5	29th	103 0	40·0	6th	63 0
May ...	81·4*		84·6	90·8		97·2	25·1	72·1	9th	104·0	47·0	20th	57·0
June ...	79·1*		81·4	84·4		88·0	14 2	73 8	26th	97·0	30 0	1st	67 0
July ..	83·1*		82·5	84·8		90·1	8 8	81·3	8th	98·0	27·0	18th	71·0
August ...	78·7	74.8	80·3	82·2	77·7	87·0	13·7	73·3	10th	91·0	20·0	31st	71·0
September	77·8	74·2	79·9	80·9	76·5	86·6	14·0	72·6	10th	92·0	24·0	7th	68·0
October ...	75·1	66·4	80·0	82·2	71·8	85·0	18·1	66·9	23rd	88·0	28·0	31st	60·0
November	68·3	60·8	72·8	75·8	64·0	78·1	19 3	58·8	4th	83 0	28·0	29th	55·0
December	61 9	52·9	67·0	70·3	57·7	73·2	23 0	50·2	27th	79·0	36·0	31st	43 0

BERHAMPORE.

	Mean.	4h.	10h.	16h.	22h.	Mean of Max.	Mean daily range.	Mean of Min.	Highest Max.		Monthly range.	Lowest Min.	
									Day.	°		Day.	°
January ...	63·8*		63·5	73·4		75·4	21·1	54·3	29th	80·0	31·0	10th	49·0
February ..	67·4*		68·6	77·7		79.7	22·5	57·2	21st	88·0	38·0	2nd	50·0
March ...	75·8*		78·6	87·0		90·1	25·4	64·7	29th	100·0	47·0	8th	53·0
April ...	...		...	...		93·8	18·2	75·6	30th	105·0	43·0	6th	62·0
May ...	84·1*		85·0	89·9		94·2	15·8	78·4	6th	105·0	36·0	14th	69·0
June ...	84·3*		84·6	87·7		91·1	10·2	80·9	25th	98·0	20·0	19th	78·0
July ...	84·5*		85·0	87·4		91·6	10·0	81·6	5th	97·0	22·0	10th	75·0
August ...	83·8*		84·5	86·4		89·6	8·4	81·2	24th	94·0	16·0	12th	78·0
September	82·8*		84·2	85·2		89·2	8·7	80·5	22nd	94·0	17·0	24th	77·0
October ...	81·4*		82·2	86·5		87·8	11·4	76.4	14th	91·0	21·0	31st	70·0
November .	73·1	67·4	72·7	81·9	70·6	82·4	15·8	66·6	3rd	86·5	25·5	21st	61.0
December ..	65·6	57·1	67·1	75·4	62·9	75·7	18·2	57·5?	12th	79·0	27·5	31st	51·5

PATNA.

	Mean.	4h.	10h.	16h.	22h.	Mean of Max.	Mean daily range.	Mean of Min.	Highest Max.		Monthly range.	Lowest Min.	
									Day.	°		Day.	°
January ...	58·3*		64·4	70·7		74·6	28·7	45.9	19th	85·0	47·0	9th	38·0
February...	61·5*		68·1	74·1		76·9	28·0	48·9	6th	85·3	42·5	27th	42·8
March ..	76·9*		87·6	91·0		93·5	30·7	62·8	31st	95·3	50·5	8th	44·8
April ...	77·8*		87·4	95·6		96·6	36.5	60·1	19th	104·3	49·5	5th	54·8
May ..	80·5*		90·3	95·7		98·3	33·0	65·3	2nd	108·3	51·5	10th	56·8
June ..	83·7*		89·4	93·8		96·5	22·8	73·7	4th	105·3	34·5	29th	70·8
July ...	84·9*		89·8	94·0		95·7	19·8	75·9	10th	108·3	37·5	12th	70·8
August ...	82·6*		86·6	89·1		89·6	13·5	76·1	11th	95·3	26·5	19th	68·8
September	82·0*		87·1	88·5		89·9	14·3	75·6	7th	95·3	22·5	13th	72·8
October ...	78·4*		85·5	90·2		90·6	23·9	66·7	7th	94·3	38·5	28th	55·8
November	67·9*		77·7	82·7		84·0	30·8	53·2	5th	89·3	46·4	29th	42·9
December	61·3	49·3	68·3	72·8	55·1	77·0	32·5	44·5	1st	87·3	49·4	23rd	37·9

MONGHYR.

	Mean.	4h.	10h.	16h.	22h.	Mean of Max.	Mean daily range.	Mean of Min.	Highest Max.		Monthly range.	Lowest Min.	
									Day.	°		Day.	°
January ...	60·6		61·6	69·6		71·9	20·2	51·7	14th	77·0	33·0	3rd	44·0
February...	64·9		66·5	73·7		74·8	18·6	56·2	22nd	81·0	31·0	2nd	50·0
March ...	74·9		79·0	86·5		86·9	23·5	63·4	27th	98 0	46·0	8th	52·0
April ...	82·5		86·6	94·3		96·0	25·3	70·7	20th	103·0	40·0	6th	63·0
May ...	84·2		89·5	95·4		98·0	24·9	73·1	6th	106·0	41·0	20th	65·0
June ...	85·7		88·8	92·7		96·3	17·6	78·7	5th	106·0	31·0	16th	75·0
July ...	84·6		88·0	90·9		94·5	16 2	78·3	9th	105·0	30·0	13th	75·0
August ...	82 9		85·7	87·7		90·8	12·7	78·1	26th	96·0	21·0	2nd	75 0
September	83·8		86·2	90·7		91·0	14·0	77·0	17th	97·0	23·0	8th	74·0
October ...	79·0		85·0	88 0		91·0	21·0	70·0	9th	96·0	33·0	28th	63·0
November	70·5		76·8	81·2		84·3	24·4	59·9	21st	90·0	39·0	19th	51·0
December	62 3		67·4	73 9	66·0	76·4	25 7	50·7	7th	79·0	34·0	26th	45·0

ROORKEE.

	Mean.	4h.	10h.	16h.	22h.	Mean of Max.	Mean daily range.	Mean of Min.	Highest Max.		Monthly range.	Lowest Min.	
									Day.	°		Day.	°
January ...	55·7	46·3	58·5	65·7	52·3								
February...	59·9	52·3	62·1	68·3	56·9								
March ...	67·8	57·0	72·7	78·4	63·1								
April ...	80·0	67·0	86·5	91·5	75·1								
May ...	87·4	73·8	93·1	99·6	83·3								
June ...	89·0	81·4	91·3	97·6	85·8								
July ...	86·2	78·8	88·6	93·0	83·7								
August ...	88·5	81·0	91·5	96·1	85·6	97·8	17·6	80·2	15th	108·1	27·3	5th	75·8
September	86·2	76·4	90·5	96·7	81·4	98·3	23·8	74·5	12th	102·1	31·3	28th	70·8
October ...	78 6	64·3	86·6	92·7	70·9	94·5	34·0	60·5	2d-3d	99·2	49·5	27th	49·7
November	61·1	51·7	75·1	81·7	60·0	85·2	37·8	47·4	12th	95·2	54·0	30th	41·2
December	58·8	46·6	62·5	70·6	53·8	74·0	33·5	40·5	5th	80·2	42·5	25th	37·7

BENARES.

	Mean.	4h.	10h.	16h.	22h.
January ...			63·9	68·8	
February ...			No instrument.		
March ...			Ditto.		
April ...			Ditto.		
May ...			96·9	100·7	
June ...			93·4	96·9	
July ...			93·6	95·2	
August ...			91·0	93·9	
September ...			90·9	91·2	
October ...			90·2	92·1	
November ...			80·7	83·2	
December ...			70·3	75·0	

The temperatures of previous years for several of the stations have been published in the Journal of the Asiatic Society, in the Philosophical Transactions in Professor's Dove's valuable memoirs, and in the Messrs. Schlagintweit's voluminous work: but on due consideration I do not feel satisfied that a comparison of the present results with any of the above would lead to useful conclusions, and I content myself, therefore, with that of the Calcutta means for the past year with those of the 16 years beginning with 1853. The table, given on page 29, shows that, while the months of January, July, August, October, November and December were somewhat above the average temperature, the hot weather months and the first month of the rains were considerably below the mean. The differences are as follow:—

January	...	+0·7	July	...	+9·7
February	...	—0·7	August	...	+0·3
March	...	—1·0	September	...	—0·1
April	...	—1·4	October	..	+0·8
May	...	—1·7	November	...	+0·3
June	...	—1·3	December	..	+0·9
		Mean of year	—0·2		

SOLAR RADIATION.

The readings of a blackened bulb thermometer in vacuo, freely exposed to the sun's rays, are given for seven stations only, five of which are in Bengal. The instruments used are self-registering thermometers on either Negretti's and Zambra's or Phillip's principle, and their readings are taken on all days (whether clear or overcast) at 18h. (6 P. M.). It is directed that they be exposed about one foot from the ground above a surface of closely growing grass. This direction, I am informed, has not been observed at Jessore, where a piece of blackened board has been placed below the thermometer; and it is possible that the excess observable in the Jessore means as compared with those of Berhampore, the station most comparable with it, may be due to this cause.

Maximum, Minimum, and Mean Monthly Readings of the exposed Black-Bulb Thermometer in Vacuo.

	PORT BLAIR					CALCUTTA.				
	Mean.	MAXIMUM.		MINIMUM.		Mean.	MAXIMUM.		MINIMUM.	
		Day.	o	Day.	o		Day.	o	Day.	o
January ...						112·9	28th	120	13th	108·5
February ...						119·0	14th	126·6	6th	111·8
March ...						129·3	29th	139·0	30th	118·0
April ...						131·5	30th	139·0	25th	128·3

ERRATUM, PAGE 36.

Line 18 *from bottom of page.*

For July .. + 9 7, *read* July

	Mean					Mean.				
		Day.	o	Day.	o		Day.	o	Day.	o
January ...	131·6	24th	140·5	31st	110·0					
February ...	133·9	22nd	143·5	3rd	90·0					
March ...	141·4	25th	156·0	16th	120·0					
April ...	144·2	21st	155·0	5th	108·0					
May ...	150·7	19th	159·0	27th	110·5					
June ...	135·8	3rd	155·0	10th	83·5	133	2nd	155	7th	99
July ...	144·9	20th	157·0	2nd	115·5	140	15th	150	23rd	115
August ...	142·4	26th	156·9	14th	100·0	138	23rd	150	2nd	97
September ...	145·0	6th	157·9	26th	115·0	144	6th	153	25th	91
October ...	146·3	1st	154·5	29th	140·0	139	13th	146	2nd	108
November ...	140·2	2nd	149·2	30th	130·9	131·5	1st	140	30th	116
December ...	132·5	11th	138·0	30th	127·5	125	20th	129	10th	119

BENARES.

	Mean.	4h.	10h.	16h.	22h.
January ...			63 9	68·8	
February ...			No instrument.		
March ...			Ditto.		
April ...			Ditto.		
May ...			96·9	100·7	
June ...			93·4	96 9	
July ...			93·6	95 2	
August ...			91·0	93·9	
September					

January ...	+0 7	July ...	+9 7
February ...	—0·7	August ...	+0 3
March ...	—1·0	September ...	—0·1
April ...	—1·6	October ...	+0 8
May ...	—1·7	November ...	+0 3
June ...	—1·3	December ...	+0 9

Mean of year —0·2

SOLAR RADIATION.

The readings of a blackened bulb thermometer in vacuo, freely exposed to the sun's rays, are given for seven stations only, five of which are in Bengal. The instruments used are self-registering thermometers on either Negretti's and Zambra's or Phillip's principle, and their readings are taken on all days (whether clear or overcast) at 18h. (6 P. M.). It is directed that they be exposed about one foot from the ground above a surface of closely growing grass. This direction, I am informed, has not been observed at Jessore, where a piece of blackened board has been placed below the thermometer; and it is possible that the excess observable in the Jessore means as compared with those of Berhampore, the station most comparable with it, may be due to this cause.

Maximum, Minimum, and Mean Montbly Readings of the exposed Black-Bulb Thermometer in Vacuo.

	PORT BLAIR.					CALCUTTA.				
	Mean.	MAXIMUM.		MINIMUM.		Mean.	MAXIMUM.		MINIMUM.	
		Day.	°	Day.	°		Day.	°	Day.	°
January ...						112·9	28th	120	13th	108·5
February ...						119·0	14th	126·6	6th	111·8
March ...						129·3	29th	139·0	30th	118·0
April ...						134·5	30th	139·0	25th	128·3
May ...						135·2	28th	139·0	14th	128·8
June ...	136·0	18th	160·0	23rd	112·0	134·0	1st	139·4	25th	129·0
July ...	112·5	1st	163·0	27th	95·0	129·9	21st	139·4	28th	101·4
August ...	151·0	29th	166·0	27th	118·0	130·6	22nd	138·0	18th	113·8
September ...	150·0	30th	167·0	23rd	122·0	131·3	10th	137·5	27th	122·0
October ...	153·2	11th	165·0	5th	119·0	127·3	21st	138·0	11th	120·0
November ...	149·7	15th	167·0	26th	97·0	121·4	16th	128·4	4th	112·0
December ...	149·0	7th	154·0	28th	136·0	117·5	16th	131·0	30th	109·5

	JESSORE.					BERHAMPORE.				
	Mean.	MAXIMUM.		MINIMUM.		Mean.	MAXIMUM.		MINIMUM.	
		Day.	°	Day.	°		Day.	°	Day.	°
January ...	131·6	24th	140·5	31st	110·0					
February ...	133·9	22nd	143·5	3rd	90·0					
March ...	144·4	25th	156·0	16th	120·0					
April ...	144·2	21st	155·0	5th	108·0					
May ...	150·7	19th	159·0	27th	140·5					
June ...	135·8	3rd	155·0	10th	83·5	133	2nd	155	7th	99
July ...	144·9	20th	157·0	2nd	115·5	140	15th	150	23rd	115
August ...	142·4	26th	156·9	14th	100·0	138	23rd	150	2nd	97
September ...	145·0	6th	157·9	26th	115·0	144	6th	153	25th	91
October ...	146·3	1st	151·5	29th	140·0	139	13th	146	2nd	108
November ...	140·2	2nd	149·2	30th	130·9	131·5	1st	110	30th	116
December ...	132·5	11th	138·0	30th	127·5	125	20th	129	10th	119

	HAZAREEBAUGH.					PATNA.				
	Mean.	Maximum.		Minimum.		Mean.	Maximum.		Minimum.	
		Day.	o	Day.	o		Day.	o	Day.	o
January ...	130	27th	140	19th	102	112·9	24th	122·0	26th	81·0
February ...	132	22nd	145	24th	104	121·5	22nd	135·0	18th	100·0
March ..	137	26th	149	14th	121	130 4	31st	144·0	17th	89 0
April ...	146	21st	160	2nd	125	140·0	13th	162 0	2nd-3rd	138·0
May ...	150	8th	165	19-20	132	148·1	1st	162·0	22nd	90·0
June ...	141	6th	159	18th	95	136·3	24th	159·0	6th	100·0
July ...	147	8th	161	3rd	129	141·5	4th	162·0	25th	90 0
August ...	145	24th	163	13th	125	131·0	14th	149 0	29th	100 0
September ...	142	1st	155	13th	92	126·2	27th	152 0	22nd	93 0
October ...	143	3rd	159	27th	125	139·7	1st	152 0	31st	123·0
November ...	134	8th	143	16th	127	128·0	7th	135·0	30th	105·0
December ...	128	27th	137	30th	125	113 7	3rd	130·0	2nd	91 0

	MONGHYR.					ROORKEE.				
	Mean.	Maximum.		Minimum.		Mean.	Maximum		Minimum.	
		Day.	o	Day.	o		Day.	o	Day.	o
January ..										
February ...										
March ...										
April ..										
May ...										
June ..										
July ...	148·3	9th	159 0	17th	137·0					
August ...	142·2	15th	154·0	18th	95·0	121 8	7th	135·0	12th	99·0
September ...	143·8	27th	152·0	30th	127 0	121·7	16th	132·0	1st	99·0
October ...	143·8	11th	150·0	31st	139·0					
November ...	136·8	3rd	147·0	30th	126·0	134·8	3rd	143·0	29th	120·0
December ...	126·2	14-15	129·0	30-31	122 0	123 9	16th	132·7	28th	112·7

HUMIDITY.

The humidity of the air is calculated from the readings of the day and wet bulb thermometers, by the formulæ

$$F = f - \frac{0{,}480\ (t-t')}{1130-t}\ 29{\cdot}7$$

$$\frac{F}{f} = \frac{x}{100}$$

in which t and t' are the temperatures of the dry and wet bulbs respectively, f the elastic force of water vapour at temperature t, F that at the temperature of the dew point, and x the proportional humidity, saturation being 100.

At the Calcutta Observatory it has been and still is the practice to calculate the humidity by Mr. Glaisher's factors, the results of which differ slightly from those obtained by the above formulæ; but the differences are unimportant in comparison with the probable errors inseparable from the method of determining humidity in the ordinary way from the indications of Mason's hygrometer. The table given below shews the results obtained by both methods from the same observations, for each month of the past year.

The calculation of the mean humidity of any single day from four equi-periodic observations is subject to errors similar to those which affect the application of the same method to the determination of its mean temperature, and to others in addition, since the local humidity of the atmosphere is subject to incessant oscillation independently of the hour of the day, and to a greater extent than its temperature. The effect of these variations tends, however, to disappear, when the mean humidity of a month is thus calculated; but the mean curve of humidity like that of temperature is of less regular form than the barometric curve, and there thus arises an appreciable difference between the means of four and twenty-four observations daily.

In the following table are given the monthly means of the past year for Calcutta, as deduced from the hourly observations, side by side with those deduced from the four six-hourly readings; the calculations in both cases having been made by the application of Glaisher's factors; also the means similarly deduced from the observations of the last sixteen years.

	Mean Monthly Humidities for 1868.			Mean of 16 years' hourly observations. by Glaisher's Factors.
	From 4 Observations.		From Hourly Obs. by G. F.	
	By August's Formula.	By Glaisher's Factors.		
January	66	67	67	71
February	67	67	66	68
March	65	65	63	67
April	73	72	71	69
May	77	75	74	73
June	85	83	84	81
July	86	84	85	85
August	88	86	87	86
September	88	86	86	85
October	76	74	74	78
November	69	68	68	73
December	66	68	67	72

The difference of the results in the first three columns is not very great, but would be sufficient to vitiate any critical comparison of the humidities of different years, calculated by different methods and from series of observations differing in periodicity. It will be observed that, excepting in the driest months, December, January, February, and March, August's formula gives a higher humidity than the Greenwich factors. In December and January, the latter gives the higher results.

Mean Monthly Humidities (Saturation=100) for the year 1868.

	PORT BLAIR.					MADRAS.				
	Mean.	4h.	10h.	16h.	22h.	Mean.	4h.	10h.	16h.	22h.
January ...			74	67				65	67	
February ...			69	65				63	64	
March ...			71	69				55	60	
April ...			69	68				54	65	
May ...			80	81				56	66	
June ...			79	77				55	64	
July ...			84	82				60	60	
August ...			78	78				57	57	
September ...			81	82				58	63	
October ...			78	78				64	69	
November ...			76	76				64	64	
December ...			70	67				63	63	

	AKYAB.					FALSE POINT.				
	Mean.	4h.	10h.	16h.	22h.	Mean.	4h.	10h.	16h.	22h.
January ..			82	67		83	88	81	80	85
February ...	78	82	79	71	81	83	89	79	78	85
March ...	78	82	78	70	83	79	83	76	75	81
April ...	79	85	76	74	82	84	87	83	82	85
May ...	78	85	75	72	81	83	85	82	82	83
June ...	88	91	87	86	90	80	81	80	81	81
July ...	91	94	89	88	92	76	77	76	75	76
August ...	90	94	87	88	93	79	80	78	78	79
September ...	89	94	86	87	91	73	73	73	72	74
October ...	88	93	85	84	91	71	70	72	72	72
November ...	86	90	83	84	89	64	68	64	66	65
December ...	85	89	80	82	91	79	82	79	78	78

	CUTTACK.					SAUGOR ISLAND.				
	Mean.	4h.	10h.	16h.	22h.	Mean.	4h.	10h.	16h.	22h.
January ...	74	87	73	54	82			73	62	
February ...	73	89	69	53	81			78	68	
March ...	65	84	59	42	74			77	72	
April ...	68	81	64	54	74			80	76	
May ...	71	80	66	61	77	81	85	79	76	84
June ...	82	86	79	79	86	87	91	86	84	89
July ...	81	86	77	77	85	87	90	88	83	89
August ...	81	88	76	77	85	90	93	90	86	91
September ...	81	82	78	79	87	90	92	90	87	91
October ...	74	84	68	58	85	83	91	82	74	86
November ...	64	78	55	49	76	75	80	76	62	81
December ...	68	79	63	50	79	77	86	80	61	83

	CHITTAGONG.					CALCUTTA.				
	Mean.	4h.	10h.	16h.	22h.	Mean.	4h.	10h.	16h.	22h.
January ...			80	77		66	79	62	49	76
February ...			81	76		67	83	62	47	78
March ...			76	74		65	86	60	40	74
April ...	83	84	83	80	85	73	85	68	56	83
May ...	83	86	83	79	84	77	90	78	61	84
June ...	90	91	89	89	92	85	91	83	80	88
July ...	90	92	88	90	92	86	94	83	79	88
August ...	94	95	92	93	95	88	95	86	81	91
September ...	90	93	88	88	92	88	94	85	80	92
October ...	84	87	83	82	85	76	90	69	61	84
November ...	80	85	76	77	84	69	83	64	53	76
December .	70	77	66	65	73	66	80	62	47	77

	JESSORE.					DACCA.				
	Mean.	4h.	10h.	16h.	22h.	Mean.	4h.	10h.	16h.	22h.
January ...			69	53						
February ...			64	51		75	80	75	66	80
March ...			56	42		77	83	76	66	82
April ...			72	63		83	80	84	79	84
May ...			73	71		86	90	85	81	87
June ...			86	82		93	95	91	91	94
July ...			78	78		94	95	94	92	94
August ...			81	79		94	96	93	91	95
September ...			79	83		93	96	91	90	96
October ...			63	63		83	89	79	76	87
November ...			61	53		77	83	74	70	82
December ...			55	43		71	75	69	64	75

	HAZAREEBAUGH.					BERHAMPORE.				
	Mean.	4h.	10h.	16h.	22h.	Mean.	4h.	10h.	16h.	22h.
January ...			61	45				80	60	
February ...			58	47				71	51	
March ...			38	29				70	56	
April ...			37	23						
May ...			51	38				75	60	
June ...			74	69				85	78	
July ...			76	73				85	80	
August ...			83	80				86	82	
September ...	85	93	80	79	88			87	83	
October ...	60	67	52	50	53			72	57	
November ...	51	63	46	40	57	72	89	69	52	80
December ...	49	65	41	36	55	71	87	68	48	81

	MONGHYR.					PATNA.				
	Mean.	4h.	10h.	16h.	22h.	Mean.	4h.	10h.	16h.	22h.
January ...			70	54				73	62	
February ...			65	55				63	53	
March ...			53	46				31	30	
April ...			55	49				40	28	
May ..			50	39				48	41	
June ..			66	55				60	53	
July ...			70	66				50	57	
August ...			80	73				75	72	
September...			77	73				71	69	
October ...			54	43				51	35	
November ...			55	46				39	33	
December ...			59	46	59	57	76	46	40	67

	DARJEELING.					BENARES.				
	Mean.	4h.	10h.	16h.	22h.	Mean.	4h.	10h.	16h.	22h.
January ...	79	83	81	69	84			70	57	
February ...	82	87	84	70	88					
March ...	71	78	68	64	74					
April ...	83	90	83	74	84					
May ...	81	89	79	74	82			36	29	
June ...	91	94	89	86	94			55	49	
July ..	94	95	96	90	96			59	58	
August ...	93	96	92	88	95			63	58	
September ..	89	90	87	87	91			66	63	
October ...	78	81	75	72	84			38	32	
November ...	75	80	67 ?	72	81			38	33	
December .	75	76	72	70	84			44	34	

ROORKEE.

	Mean.	4h.	10h.	16h.	22h.
January ...	70	87	65	52	75
February ...	71	87	67	50	82
March ...	53	73	45	32	63
April ...	43	65	33	24	49
May ...	39	57	30	24	44
June ...	56	69	52	42	63
July ...	78	83	64	52	73
August ...	69	85	60	57	74
September ...	64	82	58	44	74
October ...	46	67	36	27	54
November ...	50	72	41	29	58
December ...	60	77	56	42	67

The table given at page 40 would seem to show that the humidity of Calcutta, in the months April to August of the past year, was somewhat above the mean of the 16 years during which hourly observations have been recorded; but that this excess was more than compensated by the dryness of the remaining months, so that, on the whole, the humidity of the year was slightly less than the average in the proportion of 74·3 to 76. This result is, at first sight, somewhat striking, for, as will be shewn by the rain-fall tables, the rain-fall of the past year was heavier than that of any year on record; but a further examination of the observatory registers of past years will show (if, indeed, they can be accepted as trustworthy) that this apparent anomaly of low mean humidity, coinciding with heavy rain-fall, is by no means exceptional. On comparing, for instance, the three periods 1853-58, 1859-63, and 1864-68, it would appear that the mean humidities, and mean rain-falls bear a certain inverse relation to each other, thus:—

	Mean annual rain-fall.	Mean annual humidity.
1853-58	63·64	77·9
1859-63	69·00	76·1
1864-68	75·95	73·6

and, therefore, that notwithstanding the excessive rain-fall of late years, either owing to better drainage or some other cause, the mean humidity of the atmosphere is considerably decreased. That this *may* be the real explanation I am not prepared to deny, for there is no immediate and necessary connection between the total annual rain-fall of a place and its mean humidity; and it may be conceded that, owing to local changes, the atmospheric humidity of a given place may be lessened, although, from independent causes, its rain-fall may increase. Before, however, any discussion can profitably be entered on, the preliminary question has to be considered—"Can the data be accepted as thoroughly trustworthy?" And seeing how readily the indications of the wet bulb thermometer (the only instrument used) are affected by neglect or alteration of the arrangement for moistening the bulbs, or by variation in the position of the instrument; and how easily, therefore, the humidity of the air, as calculated therefrom, may be represented in excess of the truth, it is important that this question be satisfactorily answered. For my own part I am not prepared to answer it, nor can it be answered by any one who has not been intimately conversant with the observatory practice from the beginning. Unfortunately but one series of observations, as far as I am aware, is extant; and if this be so, the whole question of the increasing dryness of Calcutta (one of great interest in a sanitary point of view) must rest on the credibility to be attached to the results of that series.*

RAIN-FALL.

A summary of rain-fall returns is given for all stations from which returns of this kind have been received. If there appears no good reason to regard them as very erroneous, it may be doubted whether any can pretend to accuracy, for all the guages that I have had an opportunity of testing have shown some error; but rain-fall is an element in which merely approximate results have a considerable practical value, and they are given, therefore, with this necessary caution.

To the second table I have prefixed the heading "The number of days on which rain was measured." This will not mislead, since it states the practical fact, while it may fairly be inferred that the fact for which it stands as a substitute, *viz.*, the number of days on which rain of measurable amount fell, bore a very close relation to it. Until within the last few months of the year, each observer took the reading of his rain-guage at the hour most convenient to him, (excepting at the regular Meteorological Stations,) but in August, directions were issued that the reading should thenceforth be recorded at 6 P. M. daily, so that the entry for any day should represent the rain-fall for that day, and 6 hours of the previous day. The Calcutta return of the number of days on which rain fell, as here given, will be found to differ considerably from that published by the

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* It was pointed out by the Meteorological Committee, in a Report dated 18th December, 1867, that the site of the present Meteorological Observatory is objectionable on many grounds. It is peculiarly so with reference to the humidity observations. The thermometer shed, in which the hygrometer is exposed, is in an enclosure of very moderate size, surrounded by lofty buildings, and stands on the edge of a tank which occupies a large part of the enclosure. Differences in the height at which the water stands in this tank must greatly affect the moisture of the atmosphere of the place. From this reason alone and supposing there be no other, I think considerable doubt must attach to the value of the humidity observations. No orders have yet been passed on this part of the Report.

Superintendent of the Meteorological Observatory. The difference is apparently due to my having observed the usual practice of recording as days of rain-fall those only on which there is a sufficient fall to be measurable, while the Observatory records as days of rain, those also on which there are but a few drops not measurable in amount.

In the following tables, as in those given in my report for last year, the stations are classified in circuits according to Geographical position as follows:—

1. **Central Circuit.**—This comprises the main portion of the Gangetic Delta, as bounded by the Bhugirutti and Hooghly, the Pudma or Ganges, and the lower Megna.

2. **South-Western Circuit.**—Comprising Orissa and the Tributary Mehals of Cuttack.

3. **Western Circuit,** which includes Chota Nagpore and all the elevated country to the westward of the Delta as far north as Rajmehal and the borders of the Ganges valley.

4. **North-Western Circuit.**—Consisting of the Gangetic plain west of the Cosi River, to the borders of Oudh and the N. W. Provinces.

5. **Northern Circuit.**—The plain north of the Ganges between the Cosi River and Assam and the Jamoona River; with the Hill station Darjeeling.

6. **North-Eastern Circuit.**—Which consists of Assam, and extends southward to the water-shed of the Garrow, Khasi, Jynteah, and Naga Hills.

7. **Eastern Circuit.**—Formed by the drainage basin of the Barak and its tributaries, the low country east of the Jamoonah, with Tipperah and Chittagong.

8. **South-Eastern Circuit.**—Represented at present by the single station of Akyab, on the Arrakan Coast.

Rain-fall in inches in 1868.

Circuit.	Stations.	January.	February.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Total.
Central.	Saugor Island ...	?	?	?	?	?	27·40	11·86	16·07	21·50	4·12	Nil	Nil	?
	Contai ...	Nil	0·65	Nil	3·35	3·78	34·43	8·76	12·69	17·74	?	?	?	81·40?
	Calcutta ...	0·05	0·18	0·16	5·47	5·80	26·61	11·17	24·83	15·69	1·53	Nil	Nil	91·49
	Howrah ...	?	?	?	?	?	23·20	14·30	25·30	21·10	0·60	Nil	Nil	?
	Hooghly ...	?	?	?	?	?	15·80	9·55	40·50	21·40	2·00	Nil	Nil	?
	Kishnagur ...	?	?	?	?	?	10·75	11·50	30·20	7·30	3·70	Nil	Nil	?
	Jessore ...	0·02	1·56	1·22	10·27	9·85	16·62	12·24	20·53	9·49	2·22	Nil	Nil	84·02
	Berhampore ...	Nil	1·38	0·78	1·98	8·12	12·71	8·40	18·07	9·36	1·07	Nil	Nil	61·87
	Fureedpore ...	?	?	?	?	?	8·90	5·40	16·10	10·60	?	?	?	?
	Burrisal ...	?	?	?	?	?	10·10	16·00	22·60	14·10	1·70	?	?	?
Western.	Burdwan ...	?	?	?	?	?	8·20	10·80	29·60	14·50	1·00	Nil	Nil	?
	Raneegunge ...	?	?	?	?	?	20·80	6·98	12·97	13·05	1·05	Nil	Nil	?
	Sooree ...	0·10	0·60	Nil	0·26	2·54	8·85	8·85	10·45	9·20	0·40	?	Nil	41·25?
	Hazareebaugh ...	0·26	0·85	0·64	Nil	1·54	14·92	9·66	11·80	9·11	0·53	Nil	Nil	49·31
	Midnapore ...	Nil	0·80	0·10	5·60	3·40	22·80	5·40	19·90	13·20	1·30	Nil	Nil	72·50
	Bancoorah ...	0·50	0·80	Nil	3·00	2·75	15·25	6·55	15·30	17·10	1·00	Nil	Nil	62·25
	Madras ...	4·75	0·03	Nil	0·40	Nil	7·19	8·67	6·47	6·58	6·40	6·47	0·52	47·48

S. Western.	Cuttack ...	0·10	0·05	0·10	1·40	3·23	17·13	10·12	8·92	9·80	1·96	Nil	Nil	52·81
	False Point ...	Nil	1·35	0·40	5·00	1·80	9·20	12·75	9·95	20·40	4·00	0·35	Nil	65·20
	Pooree ...	0·05	3·60	0·07	1·70	5·40	11·00	10·90	12·90	5·05	0·30	Nil	Nil	50·97
	Balasore ...	?	?	?	?	?	36·20	5·60	11·30	9·60	0·40	Nil	Nil	?
	Sumbulpore ...	?	?	?	?	?	23·09	4·39	4·32	3·08	Nil	Nil	Nil	?
	Roorkee ...	1·89	4·41	1·13	0·30	1·26	4·24	11·49	1·47	1·09	Nil	Nil	0·11	27·39
	Benares ...	0·10	Nil	0·35	0·60	0·75	10·10	9·75	4·25	6·05	Nil	Nil	Nil	31·95
N. Western.	Chuprah ...	0·36	0·80	0·60	0·32	2·62	5·45	3·20	7·91	4·45	Nil	Nil	Nil	25·71
	Patna ...	0·88	2·03	0·30	0·70	2·00	5·06	5·73	5·86	3·42	0·04	Nil	Nil	26·02
	Monghyr ...	0·30	1·65	0·58	Nil	1·93	3·13	8·67	12·75	3·31	0·02	Nil	0·40	32·74
	Arrah ...	?	?	?	?	?	5·40	3·10	7·83	6·20	0·40	?	?	?
	Buxar ...	?	?	?	?	?	3·55	9·15	7·15	5·30	Nil	Nil	?	?
Northern.	Darjeeling ...	0·45	1·35	1·17	3·26	4·67	34·75	31·39	43·35	14·35	0·12	Nil	0·18	35·34
	Maldah ...	0·05	Nil	0·05	2·00	3·50	7·20	6·65	15·21	8·55	0·10	Nil	Nil	43·31
	Rampore Beauleah ...	0·02	3·40	3·00	3·10	9·25	14·45	13·20	10·75	11·20	3·15	Nil	Nil	71·52
	Pubna ...	?	?	?	?	?	11·34	10·35	17·18	17·20	0·88	Nil	Nil	
	Bograh ...	?	?	?	?	?	15·50	11·90	3·80	?	?	?	?	
	Rungpore ...	?	?	?	?	?	15·50	15·70	14·90	28·60	0·50	Nil	Nil	
	Dinagepore ...	?	?	?	?	?	18·93	11·20	12·10	13·30	0·10	?	?	?
	Mynagoree ...	?	?	?	?	?	?	?	23·75	30·43	2·10	Nil	Nil	?
N. Eastern.	Shillong ...	Nil	1·80	1·90	2·20	9·00	13·40	14·00	7·30	17·30	3·90	0·05	0·35	71·
	Gowalparah ...	?	0·72	0·76	8·41	4·67	20·91	19·22	16·92	14·34	1·05	Nil	Nil	87·0

Rain-fall in inches in 1868.—(Continued.)

Circuit.	Stations.	January.	February.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Total.
N. Eastern.	Mymensingh ...	?	?	?	?	?	25 55	16·75	20 70	9 90	1·10	Nil	Nil	?
	Gowhatty ...	?	?	?	?	?	4·70	11 00	7·70	9·40	0·40	Nil	0·60	?
	Dholebagan ...	Nil	5 95?	2 36	17 34	3·41	19 26	16 02	9 76	12·14	2·11	0 10	0 52	88 97
	Nowgong ...	?	?	?	?	?	11·00	19 50	17·60	19 70	4·00	?	?	?
	Tezpore ...	?	?	?	?	?	6 82	10 [illegible]	16·48	6·94	0 77	0·53	0 63	?
	Seebsaugor ...	?	?	?	?	?	7·90	22·30	20·60	13 00	1·70	0·80	0 50	?
	Dibrooghur ...	?	?	?	?	?	33·36	32·50	30·00	27·80	2·90	1 00	1·10	?
	Samogoodting ...	?	?	?	?	?	?	0 52	5·30	?	?	?	?	?
Eastern.	Chittagong ...	Nil	6 21	2·40	19 96	11 26	49 63	15·62	29·19	18·01	0 46	1·31	Nil	154·05
	Noakhally ...	?	?	?	?	?	30·87	11·15	12 08	7·86	1 24	1 17	Nil	?
	Dacca ...	Nil	4 90	0 70	9·60	5 70	15 10	8 00	17·17	14 56	0 94	0 11	Nil	76·78
	Cherrapoorjee ...	?	?	?	?	?	134·95	170·28	82·74	85·74	1·36	?	?	?
	Sylhet ...	?	?	?	?	?	35·25	27·05	25·68	16·19	5·05	Nil	Nil	?
	Cachar ...	Nil	9·60	2·00	17·25	6·85	18·80	16·70	15·30	16 05	9·45	Nil	Nil	112·00
	Tipperah ...	?	?	?	?	?	26 38	7·96	13 16	15·32	1·87	2·40	Nil	?
	Chundergona ...	?	?	?	?	?	?	6·60	5·75	9·86	0·16	1·20	Nil	?
S. Eastern.	Akyab ...	Nil	Nil	0·22	1 94	3 10	61·95	44·14	36 19	21·65	12·17	8·23	Nil	189·59
	Port Blair ...	Nil	Nil	0 13	1·02	16 99	11 87	17 62	11 39	22·11	12·27	9.11	1·04	103 56

Number of days on which Rain was measured in 1868.

Circuit.	Stations.	Jan.	Feb.	March,	April.	May.	June,	July.	August.	Sept.	Oct.	Nov.	Dec.	Total.
Central.	Saugor Island ...	?	?	?	?	?	16	16	11	20	3			?
	Contai ...		2		6	5	13	16	17	16	?	?	?	?
	Calcutta ...	1	1	1	6	10	21	19	20	22	2			103
	Howrah ...	?	?	?	?	?	8	11	19	17	1			?
	Hooghly ...	?	?	?	?	?	8	12	19	13	2			?
	Kishnagur ...	?	?	?	?	?	8	15	20	9	2			?
	Jessore ...	1	3	3	19	15	20	21	22	21	4			129
	Berhampore ...		4	1	6	9	14	18	15	19	2			88
	Furreedpore ...	?	?	?	?	?	15	13	12	14	?	?	?	?
	Burrisal ..	?	?	?	?	?	10?	23	25	17	3?	?	?	?
Western.	Burdwan ...	?	?	?	?	?	?	10	20	18	1			?
	Raneegunge ...	?	?	?	?	?	15	11	18	19	1			?
	Sooree ...	1	2		3	6	12	12	13	17	1			?
	Hazareebaugh ...	1	3	3		6	14	19	19	6	2			73
	Midnapore ...		2	1	4	7	15	10	18	16	2			75
	Bancoorah ...	2	3		3	7	15	13	16	17	2			78
	Madras ..	2	1		1		9	12	14	9	9	9	1	67

Number of days on which Rain was measured in 1868.—(Continued.)

Circuit.	Stations.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Total.
S.-Western.	Cuttack ...	1	1	1	3	7	18	15	14	20	2			82
	False Point ..		2	1	4	6	10	15	2	17	5	2		64
	Pooree ...	1	3	2	1	6	16	14	14	12	1			70
	Balasore ...	?	?	?	?	?	18	9	18	17	2			?
	Sumbulpore ...	?	?	?	?	?	15	13	10	10				?
	Roorkee ...	4	9	4	3	4	7	8	4	1			1	45
	Benares ...	1		2	1	2	7	12	8	10				43
N.-Western.	Chuprah ...	3	4	2	1	3	6	5	8	8				40
	Patna ...	6	6	2	1	5	9	9	11	13	1			63
	Monghyr ...	1	4	3		5	9	12	14	10	1		2	61
	Arrah ...	?	?	?	?	?	6	5	12	13	1	?	?	?
	Buxar ...	?	?	?	?	?	8	12	11	13			?	?
Northern.	Darjeeling ...	2	9	5	13	15	26	28	23	18	3		1	143
	Maldah ..	1		1	5	5	14	15	10	11	1			63
	Rampore Beauleah ...	1	3	2	5	9	17	17	17	13	3			87
	Pubna ...	?	?	?	?	?	19	19	14	19	2			?
	Bograh ...	?	?	?	?	?	19	13	4?	?	?	?	?	?
	Rungpore ...	?	?	?	?	?	13	16	13	13	3			?
	Dinagepore ...	?	?	?	?	?	15	13	12	11	1	?	?	?
	Mynagooree ...	?	?	?	?	?	?	?	7	15	2			?

NORTH-EASTERN.	Shillong		7	2	5	12	20	12	13	26	8	1	3	109
	Gowalparah	?	6	4	15	18	25	26	22	16	2			?
	Mymensingh	?	?	?	?	?	21	19	18	17	3?			?
	Gowhatty	?	?	?	?	?	15	20	14	12	1		1?	?
	Dholebagaun		?	5	26	11	24	28	25	23	10	2	2	?
	Nowgong	?	?	?	?	?	8?	14	17	10	5?	?	?	?
	Tespore	?	?	?	?	?	8?	22	26	14	5	2	3	?
	Seebsaugor	?	?	?	?	?	?	22	22	16	3	2	2	?
	Dibrooghur	?	?	?	?	?	18	25	19	7	3	1	4	?
	Samogoodting	?	?	?	?	?		3?	12?	?	?	?	?	?
EASTERN.	Chittagong		4	3	7	7	19	21	21	16	3	5		106
	Noakhally	?	?	?	?	?	18	18	15	12?	2	2		?
	Dacca		3	2	11	7	18	13	17	18	4	1		94
	Cherrapoonjee	?	?	?	?	?	23	30	28	18	5	?	?	?
	Sylhet	?	?	?	?	?	24	27	26	18	4			?
	Cachar		5	6	21	10	22	28	21	19	8			140
	Tipperah	?	?	?	?	?	19?	19	21	19	6	1		?
	Chundergona	?	?	?	?	?	?	13	25	17	5	6		?
S. EASTN.	Akyab			1	6	7	23	28	24	24	11	7		131
	Port Blair			2	2	20	21	27	20	28	19	18	2	159

The rainy season of 1868 was characterised by a fall of rain in Lower Bengal much above the average; in Calcutta, indeed, the quantity registered is the highest on record; while in the North-West Provinces and a portion of Behar, there was a deficiency of the usual rain-fall. The following table will serve to illustrate this fact by presenting a comparative view of the rain-fall of 1868, and the mean rain-fall of several years at seven selected stations :—

STATION.	Rain-fall, 1868.	Difference.	Mean Rain-fall.	Mean deduced from	
				Years.	Periods.
	ins.	ins.	ins.		
Madras	47·48	− 1·42	48·90	32	
Calcutta	91·49	+ 24·53	66·96	32	1837-68
Dacca	76·76	+ 5·64	71·14	10	8 years [Dove] 1851, 1868.
Berhampore	61·87	+ 10·06	51·81	9	1851, 57-59, 64-68
Darjeeling	135·34	+ 9·71	125·63	5	1851, 57, 59 1868
Benares	31·95	− 4·28	36·23	8	63-1851, 58-59 65, 67-68.
Roorkee	27·39	− 8·10	35·19	7	1860, 63-68.

The periods for which the averages are taken are too short to admit of anything like exact results, except, perhaps, in the cases of Calcutta and Madras, but they are sufficient to afford evidence of the fact noticed above.

It may be observed that in Lower Bengal nearly the whole of the excessive fall occurred in the months of June and August. In July the quantity was somewhat below the average, and the six months January to March and October to December were unusually dry. These variations coincide with the variations in the humidity of the atmosphere, as shewn at page 40, and afford a partial explanation of the apparently anomalous coincidence of high total rain-fall and low mean humidity. Of course they throw no light on the question of a supposed secular decrease of humidity in Calcutta.

The following table shews the rain-fall of Calcutta, month by month, for the last 16 years, as registered at the Surveyor General's Office, and exhibits the fact already noticed at page 45, that during the later years of the above period, there would appear to have been a greatly increased rain-fall as compared with the earlier years; and on carrying the comparison still further back, *viz.*, for 32 years, it would at first sight appear that with certain oscillations of many years duration, there has really been a tendency to increasing rain-fall; for the mean of the first 5 years of the period 1837-41 amounted to only 56·25 inches. If we admit the accuracy of the data it would seem that during these 5 years the rain-fall was exceptionally light (every year being below the 32 year' mean), and on the other hand that the rain-fall of the years 1861, 1864, and 1868, was greatly in excess of the same mean, or indeed of the fall of any previous year of the period. But, in spite of this, the variations are not of sufficient regularity to indicate the detailed operation of any definite law, even were the trustworthiness of the data for the earlier years beyond question, a point on which I am unable to give any assurance.

ERRATUM, PAGE 54.

In right hand column of table, line beginning "Darjeeling," *for* 1851, 57,59 *read* 1851, 57-59.
In same column, next following line, for 63, 1851, 58-59, 65, 67-68, *read* 1851, 58-59, 63-65 67-68.

years duration, there has really been a tendency to increasing rain-fall; for the mean of the first 5 years of the period 1837-41 amounted to only 36·25 inches. If we admit the accuracy of the data it would seem that during these 5 years the rain-fall was exceptionally light (every year being below the 32 year' mean), and on the other hand that the rain-fall of the years 1861, 1864, and 1868, was greatly in excess of the same mean, or indeed of the fall of any previous year of the period. But, in spite of this, the variations are not of sufficient regularity to indicate the detailed operation of any definite law, even were the trustworthiness of the data for the earlier years beyond question, a point on which I am unable to give any assurance.

Table of Monthly and Annual Rain-fall at Calcutta for the 16 years, 1853-68.

MONTH.	1853	1854	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866	1867	1868	Mean of 16 years.
January	0·10	—	0·46	1·06	—	0·07	—	—	0·56	1·03	—	—	0·48	1·91	0·55	0·05	0·41
February	—	1·01	1·11	—	—	0·54	0·60	0·09	—	—	1·20	0·47	1·86	3·74	0·82	0·18	0·76
March	—	1·28	0·14	2·23	0·96	0·22	4·23	—	0·88	1·69	—	1·84	1·96	—	1·51	0·16	1·13
April	1·00	7·25	3·83	0·62	1·80	0·97	1·29	2·47	0·31	2·53	2·43	1·11	4·28	1·51	0·27	5·47	2·13
May	2·42	3·75	5·97	8·18	9·33	3·28	3·18	2·21	9·07	3·80	4·20	10·36	15·94	2·56	2·45	5·80	5·78
June	8·27	16·82	5·84	12·67	10·30	8·22	12·48	6·46	26·44	13·63	12·93	18·73	8·63	7·02	7·21	26·61	12·64
July	12·76	10·60	19·18	10·94	12·98	17·96	9·09	17·92	10·93	13·31	11·22	13·09	12·19	13·42	15·40	11·17	13·19
August	13·44	11·59	11·07	10·30	18·70	14·65	21·22	14·65	16·12	12·03	14·10	16·64	5·99	11·18	18·50	24·83	14·70
September	9·15	9·26	19·39	9·02	13·30	4·74	11·55	7·13	12·48	10·86	10·33	12·59	—	15·97	13·70	15·69	10·94
October	4·94	4·01	3·38	9·21	1·60	8·03	4·96	1·68	7·75	14·40	3·48	6·50	—	7·83	8·12	1·53	5·46
November	—	0·90	—	—	—	—	—	—	4·30	—	1·26	2·89	—	—	8·19	—	1·09
December	—	—	—	—	—	1·08	—	—	0·26	0·20	—	—	—	—	—	—	0·10
Total ..	52·08	66·47	70·87	64·23	68·97	59·76	68·66	52·61	89·10	73·18	61·15	84·22	61·58	65·74	76·72	91·49	68·33

WIND DIRECTIONS.

In the absence of a self-registering anemometer, any register of wind direction in which the observations are not recorded at short intervals, can furnish an approximative view only of the actual movements of the lower atmosphere. The arrangements for anemometrical registration at most of the reporting stations are, at present, less complete than those for recording the other principal meteorological elements, and greater practical difficulties are met with in the attempt to render the records of different stations comparable *inter se;* at Saugor Island and Calcutta, vanes have been erected with indicating dials inside the buildings on which they are fixed, so that the wind direction may be read at night with the same facility and accuracy as in the day time. At other stations, the vanes are of the common kind. Four observations are or should be recorded daily at every station, but this rule was not in operation at most of the stations during the earlier part of the past year; and thus it results that, for some months and at certain stations, the tables contain the summary of two daily observations only, in the case of one station of three observations, and for other months and stations, that of four daily observations. These variations are noted in the following pages, at the head of the table for each station.

It may be observed that, in several cases in which night observations have been recorded, the total number of observations in the month shews a deficit of three or four. This is generally due to the observer not having been able to see the vane distinctly at night time, when the night has been very dark, or the vane obscured by rain.

PORT BLAIR.

Two Observations daily.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
N ..	1	1			5		1		1	1	4	10
N E. ...	45	34	32	23	6				2	21	22	46
E. ...	8	7	11	9	3	1		1		4	4	2
S. E. ...	2	5	10	15	10	2		1		5	13	1
S ..	2		4	1	11	9	4	5	4	3	3	
S. W. ...			2	10	18	48	52	48	38	20	10	
W ...				1	1		2	5	10	5	1	
N. W ...	4	[illegible]	3	1	8		3	2	5	3	4	3

MADRAS.

Two Observations daily.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
North		1								2	7	3	
N. by E.	1												
N. N. E.	5									3	4	9	
N. E. by N	8								1	1	1	2	
N. E.	20	6	2							8	8	6	
N. E. by E.	7	1					1			4	1		
E. N. E.	14	6	2					1	3	6	5	5	
E. by N.	3		2			4	4		1	1		1	
East	2	8	3			1	1	6	4	2	1	1	
E. by S.		4	3			2	3			3	1	1	
E. S. E.		7	10	6	3	2	1	2		3	1	3	
S. E by E.		3	5		6	2			1			4	
S. E.		9	15	17	23	6	2	2	8	3	1		
S. E. by S.		2	4	6	6	2	3			1	3		
S. S. E.		1	2	12	6	5			3				
S. by E.			1	2	3						1		
South ...		3	3	5	6	1	1		2	2			
S. by W.			2	1		1				1			
S. S. W.		2	5	2	2	2	2	3	2	4			
S. W. by S.		1	1	3			1	1					
S. W.		5	2	1	3	6	3	7	1	1	3	4	
S. W. by W. ..				1		2	5	3	3	1	3	14	
W. S. W.				1	1	3	9	6	10	1	2		
W. by S.					1		5	4	4				
West				1		9	6	14	12	1			
W. by N.						2	5	5	4				
W. N. W.						4	5	4	1		1		
N. W. by W. ...				1	2	2	3	2			1		
N. W.							1			3			
N. W. by N. ...						1	1				1		
N. N. W.	2					3				6	9	1	
N. by W.								2		4	6	8	
Variable													
Calm													

AKYAB.

January, two Observations daily.; other months, four Observations daily

		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
North	...	1	15	20	10	11	2			1	6	6	4
N. by E.	...												
N. N. E.	...										1		3
N. E. by N.	...												
N. E.	...	25	26	25	13	20	9	6	8	8	29	28	39
N. E. by E.	...		2										
E. N. E.	...	1											
E. by N.	...												
East	...	4	7	8	15	15	18	24	32	28	19	6	12
E. by S.	...												
E. S. E.	...						3	11	1	15	1		
S. E. by E.	...												
S. E.	...		2	4	8	8	10	13	5	8	1	21	16
S. E. by S.	...												
S. S. E.	...				2		10	4	1			1	
S. by E.	...												
South	...		2		7	5	8	15	6	23	5	4	1
S. by W.	...				1	2		5					
S. S W.	...								4				1
S. W. by S.	...			1									
S. W.	...		3	3	25	15	50	35	40	19	13	8	14
S. W. by W.	...												
W. S. W.	...	2	1	5			1	1	5	2	4		
W. by S.	...					1							
West	...	21	19	34	19	25	6	4	14	7	20	12	8
W. by N.	..	1	1										
W. N. W.	...	2	1	1	3	5		1					
N. W. by W.	...	1		2									
N. W.	...	4	25	17	8	4		1	3	1	6	20	14
N. W. by N.	...		1										
N. N. W.	...												
N. by W.	...												
Variable	...												
Calm	..				6	12	2	2	4	8	17	3	20

FALSE POINT.

Four Observations daily.

		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
North	...	9	4	3	1	3			2	12	14	18	11
N by E.	...											1	
N. N E.	...	16	7	2					3	9	4	10	8
N. E.	...	31	15	7	1		1	1	3	8	15	34	28
N. E by E	...	1		2							2	2	4
E. N. E.	...	7	2	2	1				2	2	7	4	10
E. by N	...	1										1	
East	...	21	7	8	2		4	1	1		5	6	3
E. by S.	...		2	1							2	12	
E. S E.	...	2	2	1	1	6	2		2			3	1
S E by E	..		3	1							1	2	
S E	...	12	6		3	2	5	6	6	2	6	1	5
S E by S	...	1		3		1					1		1
S. S. E	...		4	11	4	9		7	4	2	1		3
S. by E.	...						1			1			
South	...	6	8	3	8	8	3	4	7	4	6		7
S S W	...		5	6	7	30	1	3	1	1	2		1
S W by S	...								1		2		
S. W.	...	3	22	53	76	55	61	49	12	33	6		5
W S W.	...		7	5	3		11	16	11	6	3		
West	...	4	7	7	4	4	11	18	16	17	3		3
W. N. W.	...			6			5	4	31	11	4	3	1
N. W.	...	2	5	2	1	1	6	7	13	6	15	14	10
N W by N	...											1	
N. N. W	...	1	1	2						2	7	6	5
N by W.	...	1										1	
Variable	...	2	1	3	6	5	6	5	1	3	4		6
Calm	...	1	7	1			3	3	9	1	15	1	12

CUTTACK.

Four Observations daily.

		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
North		3	2	2	2			4	1	5	27	35	20
N. by E.	...	3	2		1		2			1			
N. N. E.	...	1	2		2					2			
N. E. by N.	..	2								1			
N. E.	...	5	3	4	3	3	5	3	2	9	18	12	13
N. E. by E.	...	8	2	2					1	2			
E N. E.	...	7	2						1				
E. by N.	...	18	10	5	5	3	6		5	3			
East	...	23	12	5	5	8	5	3	7	8	14	7	31
E. by S.	...	8	5	3	2	4	1	2	2				
E. S. E.	...	2	3			2							
S. E. by E.	...		3	1					3				
S. E.	...	8	2	10	7	11	4	4	3	4	6	3	17
S. E. by S.	...	3	3	6	1		1			1			
S. S. E.	...		3	5	2			1		1			
S by E.	...	7	18	24	26	36	8	11	2	4			
South	...	5	7	13	29	23	10	11	5	24	12	7	13
S. by W.	...	2	6	10	19	12	12	19	3	3			
S. S. W.	..		2	1	1	2			2	2			
S. W. by S.	...	2	7	1			4	1		2	1		
S. W.	..	1		6	7	12	35	23	22	13	5	7	5
S. W. by W.	...	2	1		1		2		3	2			
W. S. W.	...								1				
W by S.	..			5			3	4	6				
West	...			9	2	3	9	9	15	9	13	14	11
W. by N.	...	2	7	6	3	1	3	7	15	3			
W. N. W.	...	1	1	2				2	1	2			
N. W. by W.	...	3	2	1			7		6	3	1		
N. W.	...		2		2	2	3	18	16	12	26	33	14
N. W. by N.	...	3	1						1	1			
N. N. W.	...		2	2							1	2	
N. by W.	...	5	5	2		2		2	2	3			
Variable	...												
Calm	...												

SAUGOR ISLAND.

January to April, three Observations; other months, four Observations daily.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November	December.
North	33	19	18	3	2	1	1	5	4	41	18	7
N by E.	6	4									2	
N. N. E. ...										3	42	2
N E by N.	1									1	5	
N. E.	9	6	1	2				3	17	5	16	31
N. E. by E.	1											1
E. N. E.											6	6
E by N.											1	
East	1	2	2	5	5	2	11	9	12	4	9	30
E. by S.												
E S E.												2
S E. by E.		1										
S. E.	1			7	5	10	11	15	11	2		1
S. E. by S.												
S S. E.											1	
S by E.												
South	8	16	9	16	88	35	49	28	22	4		
S. by W.												
S S. W.		1										3
S. W. by S.		2										
S W.	8	16	48	52	24	59	46	32	43	22	3	10
S. W. by W.	1	4										
W. S. W.											4	10
W by S.												
West	4		7	5		9	6	29	9	16	5	13
W. by N.												
W. N. W.												
N W. by W.		5										
N. W.	4	3	5	1		4		6	2	20	6	4
N W by N.		3										
N N. W.	2											4
N. by W.	11	1										
Variable	1											
Calm	2	4	3					1		6		

CHITTAGONG.

Two Observations daily to July; from August, four Observations daily

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November	December.
North	11	5	4		1	3				3	21	48
N. by E.	3	1										
N. N. E.	4	1	2	1	1		1	1				
N. E. by N	2	2						1				
N. E.	3	3	3		1	3		3	6	17	27	17
N. E. by E.								2	4	5		
E. N. E.			1	1			1	3	12	13	16	5
E. by N.					1		1					
East		1		4	1	7	5	14	30	35	23	21
E. by S.						2	2	1	1			
E. S. E.	1		1	2	2	3	4	3	1		7	2
S. E. by E.		1				2	1					
S. E.	1	2	1	1	1	3	6	9	16	5	1	
S. E. by S.			1	1		1		2				
S. S. E.		1	2	2	2	2	8	10	5	5		
S. by E.		4	3	11	5	9	11	2				
South		3	5	19	13	9	13	26	14	4		2
S. by W.					4	3	1	1				
S. S. W.		1	3	6	2	3	4	17	13	10	2	
S. W. by S.					1							
S W	6	16	7	5	14	6	2	10	15	9	1	3
S. W. by W.	6	4	12	1	2							
W. S. W.	4	1	7	2	2	2		2	2	1	8	12
W. by S.	5	1	5		2	1						
West	8	4	2		4			4		11	14	12
W. by N.		1										
W. N. W.	1					1			1	3		1
N. W. by W.		1										
N. W.	1				2							1
N. W. by N.	2	1	1									
N. N. W.	2		1	2								
N. by W.		1	1					1				
Variable												
Calm					1							

CALCUTTA.

Four Observations daily.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
North	39	16	4	2						3	7	10	81
N. by E.	4	1		1						3	5	4	18
N. N. E.	4	5	3		1			1	1	5	6	8	34
N. E. by N.													
N. E.	3	4	1	1	1			1	1	5	9	8	34
N. E. by E.													
E. N. E.			1		2		1		3	6	3	6	22
E. by N.		1	1		1				2	1	2	5	13
East			2	1	4	4	1	2	7	1	4	2	28
E. by S.		1	1	1	1		3	4	3	2	2	4	22
E. S. E.			1	3		2	11	3	8	2	4	2	36
S. E. by E.													
S. E.			1	8	8	7	4	5	15	5	6	1	60
S. E. by S.													
S. S. E.			2	6	16	10	11	9	10	7		6	77
S. by E.			5	8	14	5	17	11	15	8	1	3	87
South		5	17	26	28	14	24	11	15	8	3	7	158
S. by W.	1	2	15	11	19	9	13	7	11	6	2	4	100
S. S. W.	1	1	16	24	20	32	23	13	13	10	10	5	168
S. W. by S.													
S. W.	1	5	6	8	3	20	11	17	8	12	14	11	116
S. W. by W.													
W. S. W.			8	1	1	7	1	18	1	7	4	5	53
W. by S.		1	2	3		2		2		4	4	2	20
West	1	4	9	1				8	1	3	4	2	33
W. by N.		1	2	2				5		1	8	4	23
W. N. W.		3	3	3		1		1		9	4	6	30
N. W. by W.													
N. W.	5	10	4	1	1		1			8	8	4	42
N. W. by N.													
N. N. W.	10	9	2					1		5	9	12	48
N. by W.	1	1	1			1				2		3	9
Variable													
Calm													

JESSORE.

Two Observations daily.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December
North			1		1			1		1	2	9
N. E.	6	9	3	2	5		1	4	3	27	24	20
East		1		4		4						
S. E.	1	8	9	14	32	24	41	30	42	9		4
South		5		2	2	8	3	1				
S W	2	5	17	33	21	13	16	10	11	2		
West			3			10	1	3				
N W. ...	53	30	29	5	1	1		13	4	23	34	29
Variable												
Calm												

DACCA.

January, two Observations; other months, four Observations daily.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November	December.
North	24	14	4	1	1					11	14	19
N. by E.												
N. N. E.	1	2	2	1	5					2	16	6
N. E. by N.												
N. E	1	4	3	6	8	2		2	1	8	25	26
N. E. by E.										1		
E. N. E.		3	1	4	6	2		1	4	2	6	2
E. by N.								2				
East			3	5	14	2			11	6	5	4
E. by S.									3			
E. S. E ...		4	7	10	12	5	9	8	5	5	6	1
S. E. by E.									2			
S. E.		1	4	11	12	14	19	15	15	11	7	4
S. E. by S. ...									8			
S. S. E.				11	13	22	26	14	18	1		2
S. by E.									2	1		
South .. .	2	7	24	27	16	28	13	36	7	9	1	2
S. by W.									6			
S. S. W. ...		7	21	28	18	18	16	12	13	5		
S. W. by S. ...									5			
S. W.		7	19	5	6	13	4	19	8	11	3	2
S. W. by W.										1		
W. S. W.		5	10	2	2	12	3	3	3		6	1
W. by S.												
West	11	27	6	1	8	1	1	3	1		1	9
W. by N.									1			
W. N. W.		7	11	2				3	1	7	6	15
N. W. by W.									1			
N. W.	7	12	6		1		2	2	3	35	5	24
N. W. by N.								1				
N. N. W.	16	16	3	3	2	1	1	2		4	17	5
N. by W												
Variable												
Calm												

HAZAREEBAUGH.

Two Observations daily to June; other months, four Observations daily.

		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
North	...	9	6		4	7	7	2	3	15	4	7	6
N by E.	...										4	1	
N N. E.	..									1	3		4
N. E.	...	4	1	1	4	3	7	11	1	13	1	6	
E. N E.	...									2		2	
East	...	2	1	4		11	7	22	14	26		2	3
E. by S.	..											1	
E S. E.	...									3	1		
S. E	...		3	2	5	4	2	17	13	15			4
S. S E.	...										1		4
S. by E.	...											2	1
South	...	4	3	3	7	14	6	17	10	12	5	6	7
S by W.	...											6	
S. S W.	...										3	12	11
S W.		6	5	9	6	5	3	14	14	8	8	6	13
S W. by W.	...										3		
W. S. W.	...										10	1	4
W. by S.	...										1		
West	...	15	25	17	10	6	20	17	59	14	18	8	20
W. by N.	..										6	10	
W. N. W.	...										18	15	14
N. W. by W.	...										8	5	1
N. W.	...	22	14	26	24	12	8	6	10	10	17	19	19
N. W. by N.	..										3	1	
N. N. W.	...									1	9	10	11
N. by W.	...												1
Variable	...												
Calm	...												

BERHAMPORE.

Two daily Observations to October; November and December, four Observations daily.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
North ...	9	7	8	1	2			2		2	31	32
N. by E ...	4		1									
N. N. E ...	1	1							1		4	5
N. E ...	5	2	5	10	11	5	3	7	8	6	4	8
E N. E. ...						1			3		6	8
E. by N. ...									1			
East ...		2		5	13	11	3	5			4	3
E. by S. ...	1	2										
E. S. E ...						1			1	1		2
S. E. ...			3	16	14	18	36	18	22	6	4	
S. S. E. ...			1	4	7	3	2	3	8	5		1
South ...				2	3	3	3	4		1		
S. by W. ...		1										
S. S. W. ..				1	2	10	7	4	6	1		2
S. W. ...	1	5	10	11	5	4	5	8	5	5	6	3
W S. W. ...									2	1	2	4
W. by S. ...			2						1			
West ...	5	14	16	4	2	2	1	7		6	7	3
W. by N. ...	1	4	1									
W. N. W ...										8	5	7
N W. ...	28	14	14	6	2	2	2	4	1	16	22	17
N. N. W. ...	4	2							1	4	25	29
N. by W. ...	3	4	1									
Variable ...												
Calm ...												

PATNA.

Eleven months, two Observations daily; December, four Observations daily.

		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
North	...		1	1	2			2		3	10	7	2
N. N. E.	...		3	1									7
N. E.	...	2	2	2	3	17	4	5	2	22	8	3	4
E. N E.	...				1	1						1	2
East			2	10	16	20	18	26	5	17	2	1	13
E S. E.	...	4		1									1
S E.			2	4		6	10	4	7	3	2	2	5
S S. E.	..	1	1								1		4
South	...			1		1			1	1	1	2	1
S S. W.		2					1					1	3
S. W.		1	8	5	3	2	2	3	6	1	7	4	4
W S W	...	1	3										2
West	...	5	12	14	9		20	14	19	6	13	16	16
W N W	...	10	11	7	6	8	1	3				6	26
N. W.	.	2	13	16	15	7		5	22	4	16	14	17
N. N. W.	...	3		4	1						2	3	17
Variable	...												
Calm													

DARJEELING.

Four Observations daily.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
North				1	2	2	1		1		1	3
N by E												
N. N. E			2									
N. E. by N.												
N. E.		1	2	2	2	4	1	2	2	2	3	1
N. E. by E												
E. N. E.		1								2		
E. by N	1	1	1		1	1	3	3	1			
East	14	9	10	9	8	17	16	27	37	21	21	28
E. by S	2	6	1	1	3	5						
E. S. E	11	8	7	8	9	16	17	9	5	8	8	10
S. E. by E	5	2										
S. E.	9	8	10	11	13	18	21	29	22	16	13	13
S. E. by S												
S. S. E.	2					1	4					1
S by E												
South	3	1	1		4	1		3		3	11	2
S by W												
S. S. W	3		1		2	2	1	1	1			
S. W. by S												
S. W.	21	17	11	6	6	2	2	6	4	15	3	3
S. W. by W.	1	1										
W. S. W.		4	6	1		1				2	2	8
W. by S	4	5	5	3	1	5	3	1				
West	16	39	37	46	48	31	35	31	30	36	27	39
W. by N.	1	4		3	4	3	1	2				
W. N. W	2	6	5	6	2	6	2	2	3	7	7	6
N. W. by W.	2		2									
N. W	3	2	6	6	6	1	2	3	4	11	20	9
N. W. by N	1											
N. N. W.							1					
N. by W												
Variable							1					
Calm												

BENARES.

Two Observations daily

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
North	2	1			6	1	4		4	7	13	5
N. E. ...	10	3	1	3	16	8	6	5	12	6	1	7
East	6	3	8	5	11	11	15	7	17	8	2	8
S. E.	5	1	4	1	1		1		1	1	1	1
South	2								2	2	3	1
S. W. . .	7	9	5	4	2	8	3	6	5	5	4	2
West	12	31	28	33	8	25	26	34	10	15	22	29
N W.	18	7	6	11	11	2	4	6	6	11	12	6
Variable												
Calm			8	2	2	2	3	4	3	7		3

ROORKEE

Two Observations daily.

	January	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
North	1								2			
N. E.		8	4	4	1	5	8	3	4	6		1
East . .		3		2	1	1	2	1	2	3		
S. E.	4	2	4	11	20	14	15	10	11	10	7	9
South	1	1	3	3	3	3	3			1	2	
S. W.	20	11	3	7	7	7	5	5	3	3	1	5
West	7	5	10	7	6	11	10	13	7	7	4	4
N. W.	8	18	20	15	4	4	6	11	9	9	9	13
Variable												
Calm	21	10	18	11	20	15	13	19	22	22	37	30

APPENDIX A

Specimen of Telegram and Translation.

Telegram.

KBL VNKQL half of BVKBNC QNLZZ half of BNKCZZ CCBKZ half of JJGZZ. Initials BV.

Conversion.

5·16—97586 half of 195172—87600 half of 175200—22150 half of 44300, Initials BV

Interpretation.

5th day 16h.

Barometer	29.75
Attached Thermometer	86
Thermometer dry bulb	87
Difference of wet and dry bulbs ...	6.
Rain-fall	·0·0 ins.
Wind	W. S. W.
Velocity	15 miles per hour.
Cloud	0·

Sky clear.

Atmosphere transparent.

APPENDIX B.

(*Specimen,*)

Abstract of Observations as received in the Meteorological Reporter's Office, Calcutta FOR THE MONTH OF MARCH, 1869.

N. B.—The Barometric data are reduced for temperature, and not for height above sea level.

STATIONS.	Height above sea level.	BAROMETER. Means of Mean.	4 hours.	10 hours.	16 hours.	22 hours.	Range.	THERMOMETER. Solar radiation. Mean.	Max. Day.	Max. °	Min. Day.	Min. °	Mean of max.	Mean daily range.	Mean of min.	Mean.	Means of 4 hours.	10 hours.	16 hours.	22 hours.	Highest Max. Day.	°	Monthly range.	Lowest Mean. Day	°	HUMIDITY Mean.	Means of 4 hours.	10 hours.	16 hours.	22 hours.	Rain-fall.	No. of days' rain.
Port Blair ...	219ft.	...	..	29·753	29·647	..		152·9	8th	[illegible]	4th	145·0	87·5	13·4	74·1			84·3	56·1		25th	92·0	21·0	15th	71·0			67	62		Nil	
Madras ...	29		..	29·955	29·831	..		..						..				87·2	85·9?		..							56	62?		Nil	
Akyab .	7·5	29·898	29·872	29·954	29·857	29·910	·097	..	...		..		88·9	17·8	71·1	80·3	75·5	81·8	84·8	79·2	19th	97·0	33·0	2nd	64·0	72	80	66	65	78	Nil	
False Point ...	18·7	29·954	29·935	29·997	29·913	29·951	·084	...	...							80·3	76·6	82·6	83·3	79·4			...			85	88	82	82	88	3·60	6
Cuttack .	80	29·848	29·839	29·912	29·771	29·872	·141						92·0	22·7	69·3	81·3	75·5	83·7	87·4	78·9	29th	97·0	29·5	10th 11th	67·5	71	93	67	56	79	2·77	8
Saugor Island..	4	29·893	29·865	29·941	29·849	29·906	·092						85·6	10·0	74·6	81·3	78·2	82·0	84·6	80·3	26th	90·3	24·8	10th	65·5	82	87	82	74	87	3·09	7
Chittagong ..	108	29·782	29·865	29·843	29·736	29·777	·107									80·5	76·2	82·2	84·2	79·5				..		79	84	76	71	84	0·52	3
Calcutta .	18·11	29·872	29·842	29·946	29·817	29·863	·129	126·7	31st	135·0	10th	110·0	88·2	14·8	73·4	80·3	74·6	81·0	87·3	78·3	31st	94·5	28·7	10th	65·8	71	87	69	52	78	4·59	4
Jessore ..	15	29·888	29·872	29·951	29·820	29·909	·131	143·0	19th	154·0	4th	115·0	91·8	23·9	67·9	79·9	70·9	84·7	88·7	75·6	31st	100·5	38·7	10th	61·8	68	90	57	46	79	3·39	4
Dacca ...	35	29·839	29·824	29·908	29·777	29·848	·131						89·7	20·8	68·9	78·7	70·8	84·1	85·9	74·0	31st	98·7	34·2	11th	64·5	72	92	59	53	84	2·24	5
Hazareebaugh.	2010	27·867	27·842	27·927	29·809	27·[illegible]2	·118	141·6	3rd	153·0	14th	132·0	86·5	24·4	62·1	73·7	64·2	77·3	83·0	70·3	31st	94·0	39·0	10th	55·0	51	66	45	36	59	1·97	7
Berhampore .	80	29·806	29·784	29·887	29·738	29·8[illegible]	·149	141·8	29th	149·5	7th	118·5	90·6	19·4	71·2	79·9	72·6	81·3	88·8	77·2	28th	104·0	39·2	3rd	64·8	57	73	53	39	65	3·28	4
Patna .	171	29·672	29·650	29·741	29·623	29·676	·118	146·3	30th	157·0	29th	116·0	91·8	31·4	60·4	76·9	64·3	82·9	88·9	71·8	31st	98·3	47·2	9th	51·1	38	55	31	24	43	0·55	8
Monghyr	150	.	..	29·776	29·651	29·720	·125	145·4	21st	155·0	22nd	130·0	93·3	29·7	63·6			82·0	89·5	76·0	31st	100·0	41·0	13th	59·0		.	47	39	57	0·64	4
Darjeeling .	6730	23·313	23·280	23·356	23·288	23·328	·076						63·9	19·2	44·7	52·8	48·1	51·9	58·1	50·1	18th	72·0	33·3	10th	36·7	61	54	63	55	71	1·20	5
Gowalparah	?			29·503	29·373	..		125·8	29th	137·0	4th	105·0	85·9	24·2	61·7			79·1	83·6		27th	94·0	30·8	12th	57·2			54	41	...	0·58	4
Debrooghur* ..	620	29·956	29·949	30·024	29·900	29·950	·124	119·3	27th	128·0	3rd	100·0	80·0			68·0	62·3	70·1	76·4	65·7	19th 20th	87·0				61	89	77	70	88	2·10	4
Benares .	260	29·662	29·638	29·723	29·617	29·663	·106											85·4	89·8									83	27		0·40	2
Roorkee ...	890	28·996	28·968	29·0[illegible]3	28·970	29·003	·175	133·5	28th	147·1	15th	77·1	79·6	22·0	57·6	68·[illegible]	60·[illegible]	71·7	76·[illegible]	64·1	30th 31st	89·2	37·0	8th	52·2	65	80	61	48	72	3·22	8

* No correction for index error has been applied to the Debrooghur Barometric readings.

APPENDIX C.

(*Specimen.*)

Weekly Report of Rain-fall compiled at the Meteorological Reporter's Office.

Divisions.	Stations.	Rain from 31st May to 6th June 1869.	Rain from 7th to 13th June 1869.	Rain from 1st January 1869.		Remarks
				Rain.	Up to Date.	
		Inch.	Inch.	Inch.		
Central.	Calcutta	Nil	11 81	23·54	13th June 1869.	
	Saugor Island	ditto	5·40	14·20	ditto	
	Jessore	ditto	9 59	27 83	ditto	
	[illegible]agur	Not received.	Not received.	4·20	30th May 1869.	Not received from 1st to 7th Jan.
	Hooghly	Nil	9 80	21·10	13th June 1869	
	Howrah	ditto	12 30	31·48	ditto	Not received from 15th to 21st Mar.
	Serampore	Not received	Not received	11 50?	16th May 1869.	Not received from 29th March to 18th April, and 26th April to 9th May.
	Pubna	0·48	11·71	29·61	13th June 1869	
	Furreedpore	Nil	Not received.	15·40	6th June 1869	Not received from 1st to 24th January, 16th to 28th February, 8th to 14th and 22nd to 31st March, and 5th to 11th April.
	Contai	ditto	7·33	18·68	13th June 1869	
	Berhampore	0 12	8 30	17·36	ditto	
	Alipore	Nil	Not received	12 90?	6th June 1869	
Western.	Burdwan	ditto	9·30	14 00	13th June 1869.	
	Raneegunge	ditto	3 50	9·26	ditto	
	Purulia	0 20	2·35	3 15	ditto	Not registered from 1st January to 9th May.
	Sooree	Nil	9·00	14·90	ditto	
	Deoghur	0 70	3·33	8 96	ditto	
	Hazareebaugh	0 14	Not received.	3 52	6th June 1869.	
	Chyebassa	Nil	ditto	2·56	ditto	Not received from 1st January to 2nd May.
	Midnapore	ditto	3·20	14 70	13th June 1869.	
	Bancoorah	0 25	3 45	12·75	ditto	
South-Western.	Cuttack	0 40	1 50	7·87	ditto	
	False Point	Nil	Not received.	5·90	6th June 1869.	
	Pooree	Not received	ditto	1·00	30th May 1869	
	Balasore	Nil	1·92	10·34	13th June 1869	
	Sumbulpore	1·00	Not received.	2 30	6th June 1869.	Not received from 19th to 25th April.
North-Western.	Benares	Nil	Nil	0·45	13th June 1869.	
	Chuprah	ditto	0·60	1·13	ditto	
	Patna	ditto	0 12	1·67	ditto	
	Monghyr	ditto	1·23	3·62	ditto	
	Bhaugulpore	3 00	4 70	10 30	ditto	Not registered from 1st January to 25th April.
	Arrah	Nil	1 20	2·10	ditto	
	Buxar	ditto	1·30	1 70	ditto	Not received from 1st January to 21st March.
	Chumparun	ditto	0 40	1·40	ditto	Not received from 1st January, to 25th March
Northern.	Darjeeling	1 77	2·56	15 68	13th June 1869.	
	Maldah	0 70	11 57	16 06	ditto	
	Rampore Beauleah	0 60	13·75	23·00	ditto	
	Bograh	0·20	Not received.	14 30	6th June [illegible]	
	Rungpore	8 50	17·40	36 40	13th June 1869.	
	Dinagepore	7 70	9·50	26·55	ditto	
	Julpigoree	12 05	6·92	34·57	ditto	
	Mynagoree	Not received.	Not received.	Nil	14th Jan. 1869.	
North-Eastern.	Shillong	0·8[illegible]	ditto	16·16	6th June 1869.	Not received from 20th to 31st Ma
	Gowalparah	7·86	ditto	28·58	ditto	
	Mymensing	0·80	ditto	83·85	ditto	Not rece[illegible] from 15th [illegible] rary and 8[illegible] to 2[illegible] March.
	Gowhatty	1·70	ditto	25·00	ditto	
	Noakhally	0·50	ditto	9·61	ditto	Not received from 15th to 28th Feb.
	Nowgong	1·60	ditto	24·10	ditto	
	Tezpore	3·03	ditto	21 39	ditto	
	Dholebagaun	Not received.	ditto	30 62	30th May 1869.	Not received from 17th to 23rd May
	Seebsaugor	1·[illegible]0	ditto	39 70	6th June 1869.	
	Deebrooghur	3·00	ditto	55·88	ditto	
	Samoogooting	Not received.	ditto	10·75	30th May 1869.	Not received from 10th to 16th May
Eastern.	Chittagong	Nil	3 50	20·00	13th June 1869.	
	Dacca	ditto	Not received.	22·31	6th June 1869.	
	Burrisaul	0·10	ditto	4·00	ditto	Not received from 1st January to 11th April and 19th April to 9th May
	Tipperah	2·05	ditto	35·63	ditto	
	Sylhet	3·70	ditto	70·00	ditto.	
	Cachar	2·17	ditto	41·93	ditto	
	Rangamatea Hill	2.10	ditto	28·35	ditto	